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ORIGINAL COMMUNICATIONS.

SOME PHASES OF AURAL DISEASE.[1]

BY S. MACCUEN SMITH, M.D.,

Professor of Diseases of the Ear in the Jefferson Medical College of Philadelphia.

Although many of us have agitated the question for a number of years, it is still apparent that an incredibly large percentage of the medical profession possesses a very meager appreciation of the danger-signals of aural afflictions.

Formerly, on account of lack of knowledge of the ear and its diseases, this apathetic attitude was comprehensible, but considering the widely disseminated educational campaign of recent years on pathologic otology, I feel that we have not achieved a success commensurate with our efforts.

Two principal reasons seem to be responsible for this indifferent attitude both on the part of some members of the profession and of the public. The latter is well illustrated by the old adage of our forefathers of some generations ago, born of their ignorance of the subject, that it is dangerous to interfere with a discharging ear; the second more important reason why this false impression still lives and struggles so tenaciously for its existence is due to the fact that some aurists yet adhere to the ultra-conservative method of treating acute suppurative diseases of the ear. We are all aware that occasionally a case, though presenting more or less alarming symptoms, will effect a spontaneous cure without operation. However safe this practice of "watchful waiting" may be in the hands of an expert, I believe it most dangerous to follow as a routine method of treatment even for the usual skilled aurist. The truth of the matter is that even with the aid of Roentgenography we are many times unable to estimate the exact degree of destruction taking place in an acute suppurative inflammation of the organ of hearing, or the direction in which this destructive carious erosion may proceed. Therefore, it seems most unwise to wait until grave symptoms, probably indicating an intracranial complication, present themselves before resorting to operative intervention.

I do not wish to be understood as advocating, for instance, a mastoid operation in cases of acute inflammation without making every effort for their non-surgical relief, but I do consider it unfortunate to wait purposely until there occurs a carious erosion through the cortex or through the tip, resulting in the characteristic swellings, before operation is advised.

Modern aseptic surgical otology has rendered the mastoid operation, if performed early, probably the most successful procedure in all surgery. Furthermore, early surgical intervention will not only prevent the various intracranial complications, in most instances, but will also almost assuredly preserve the hearing.

Some phases of this subject are forcibly illustrated by a few interesting cases which I will briefly recite.

In former years, when a diagnosis was doubtful, it was convenient for the medical profession to designate many such cases as malaria. In more recent times this mala-

[1]Read before the American Otological Society, Washington, D. C., May 9 and 10, 1916.

rial incubus has been banished, through the enlightenment of the popular mind, only to be replaced by the omnipresent influenza, a term at present quite acceptable to the public even though the condition be non-existent, and to-day we have the bacillus of Friedlander arraigned at the bar as indiscriminately as was formerly the supposed miasma of malaria.

The following case of brain abscess well illustrates the error into which physicians are liable to fall, owing to incomplete diagnostic methods:

Male, sixty years of age, enjoyed exceptionally good health up to six weeks previous to operation, which occurred three years ago. Patient complained bitterly of general head pain, which was somewhat relieved by exerting severe pressure with his hands. This condition continued for a period of two weeks without additional manifestations. During this time he was advised to remain in bed, but refused compliance. At the end of two weeks he gradually became stuporous, with occasional lucid intervals, and so remained until the time of his death, four weeks later. Two weeks before he died he was removed to the hospital to be kept under observation. At the onset of his illness he was supposed to be suffering from influenza, and later, on account of having chills every second or third day, his malady was diagnosed as malaria, but a blood examination failed to confirm this suspicion.

I was walking past this patient's room with the resident physician, and my attention being attracted by his labored breathing, I remarked to the resident that it sounded like a patient suffering from a brain abscess. I was informed that a diagnosis had not been made, although the patient had been treated for the two diseases above mentioned. The resident asked me to examine the man, but as the case was a private one I was unable to comply with his request. Two days later, however, a spontaneous rupture of the right membrana tympani occurred, followed by the same condition in the left ear early the next morning. At this time I examined the man, performed a simple mastoid operation on the right ear, and, on account of the great destruction, a radical operation on the left side. There were no exposures on the right side, but on the left we found a perisinus abscess formation, as well as a large carious exposure of the dura through the tegmen antri and tegmen tympani, well covered with granulation tissue, through the center of which pus escaped.

The interesting points in this case are that although the patient complained of severe head pains for a period of six weeks prior to the operation, he did not at any time locate this pain definitely in either ear. This no doubt was responsible for the failure to have an aural examination. The second point of interest is one of very common occurrence—the tendency, in the absence of an exact diagnosis, to pronounce an influenzal state the causative factor. It does not seem to be generally appreciated that confined pus within the tympanic or mastoid cavity will give symptoms simulating those of influenza, the result being that the ear, which is so frequently the only part of the organism involved, is entirely overlooked, showing the wisdom of a routine examination of the ear in a case of doubtful diagnosis. This is of especial importance in children. Indeed, a failure to examine the ear would seem to be almost criminal neglect in many instances.

It is quite true that in this case the aural involvement may have been secondary to an influenzal infection, but, granting this, it would not explain the chills and semicomatose state which were continuous during the last week of the patient's life and latterly attributed to malaria.

Inasmuch as this patient, as above stated, did not complain of actual aural pain, it is not amiss to emphasize to the general profession that there are two distinct types of acute aural inflammation: one in which the symptoms are frank and very severe; the other type in which the symptoms referable to the ear are almost *nil*, even in the presence of most extensive destruction, and yet in this latter class the existence of aural disease can be determined on examination by an expert.

The second case well illustrates the folly

of procrastination in some acute aural afflictions:

Male, seven years of age, contracted an acute suppurative otitis media, complicating a so-called "cold in the head." The ear was entirely overlooked for a period of two weeks, during which time the child suffered severely from general head pains, no aural trouble being suspected until a discharge through a spontaneous rupture of the membrana tympani was discovered by the nurse, the temperature ranging meanwhile from 99° + to 104°. The spontaneous rupture was in the superior anterior quadrant, and was therefore enlarged and the middle ear aspirated. The pain and fever were lessened for two days only, and during the following week ranged as heretofore. It was impossible, on account of the child's fretfulness, to determine definitely the presence of tenderness on pressure over the mastoid process.

On several occasions I suggested to the attending physician the advisability of performing a mastoid operation. He, however, on account of the importance of the child, who was the sole heir to an enormous estate, hesitated to assent to this suggestion. On the ninth day following the spontaneous rupture there appeared a distinct drooping of the superior posterior wall. A mastoid operation was then urged and again refused, the same reason being given. The following day the child's mentality seemed to me to be somewhat cloudy. It was asserted, however, that this was due to a wakeful night. At this juncture I advised the medical attendant and the family that unless they consented to operative intervention, I would no longer assume the responsibility of the child's condition. This attitude resulted in another consultant being called, who in turn gave as his opinion that he saw no reason for immediate operation, although he felt that one might be necessary eventually. This verdict was pleasing to both the child's physician and the family.

Eight days later I was summoned in great haste to see this child, being requested to bring my instruments with a view of immediate operation. On arrival I found the patient had been semiconscious for two days, opisthotonos was present, several severe convulsions were reported, the temperature ranging as high as 106° +, and death ensued within the next half-hour, without the patient having the benefit of surgical intervention.

With this history it is needless to state that the boy succumbed to a diffuse, purulent meningitis, all of which, to my mind, would have been prevented had an early operation been permitted for the evacuation of the infectious material.

The last case I shall outline shows another form of aural disease, not quite so common but just as grave:

Male, forty-one years of age, suffered from a chronic recurrent suppurative otitis media for thirty-eight years, the disease complicating an attack of measles at the age of three years. Until the last five years preceding operation the patient was not conscious of the slightest discomfort other than the annoyance of the discharge when present. During the last five years, however, he suffered almost constantly from what was termed a mild form of neuralgic headache, this at times becoming very severe. His general health was much impaired, to such an extent, indeed, that he was unable properly to attend to his large interests. This condition culminated in the patient being found unconscious in the drawing-room of a train between New York and Philadelphia. He was taken from the train to the hospital, where, on account of a foul-smelling discharge escaping from the ear and the absence of any other symptoms to account for his condition, I performed a radical mastoid operation. The cortex was ivory-like in density, the antrum decidedly small, and the sinus pushed far forward. The middle ear and antrum were well filled with considerable cholesteatomatous material and foul-smelling pus. The dura was exposed by carious erosion through the tegmen tympani, through an opening in which a quantity of pus escaped. With dilating forceps an additional amount of pus was evacuated from apparently the temporosphenoidal lobe.

This patient completely recovered in due course and returned to his duties, and only

recently expressed the opinion that he had never known what it was to feel really well and vigorous until after this operation. He has increased in weight and enjoys must excellent health.

Cases of neglected aural disease might be indefinitely enumerated not only in my practice, but in that of us all. My object, therefore, in presenting this elementary note is for the purpose of soliciting on the part of my colleagues a continuation of our educational programme.

THE CONSERVATIVE TREATMENT OF THE AFFECTIONS OF THE LACHRYMAL DRAINAGE APPARATUS.[1]

BY S. D. RISLEY, A.M., M D., PH.D.,
Surgeon to the Wills Eye Hospital, Philadelphia.

"The ophthalmic surgeon meets with no more numerous, annoying, or persistent class of affections than those involving the lachrymal apparatus, especially that part constituting the drainage system." This sentence is a quotation from a paper on "Epiphora" presented at Denver, Colorado, before the Section on Ophthalmology of the American Medical Association in June, 1898. To-day I would not, based as then upon my personal experience, write in so pessimistic a strain. In other words, I wish to say that I have in large measure lost my former dread in undertaking the treatment of lachrymal obstructions.

My first independent study of the subject was presented before the Pennsylvania Medical Society at Lancaster, Pa., in 1877. Through the courtesy of the late Dr. Harrison Allen I secured a large collection of dried skulls and wet preparations exhibiting the lachrymal duct and its relation to the nasal passages. I was induced to undertake the study because of the unsatisfactory results I had had in the treatment of lachrymal diseases by the methods then employed, viz., by slitting the lower *punctum lachrymarum* and canaliculus for the more ready passage of a series of silver probes through the nasal duct to the floor of the nostril. The painstaking study of the anatomical features of the nasal duct in a large series of cases led very speedily to the conclusion that the treatment by frequent and, too often, violent probing of this nasal duct was responsible for the chronicity of the affection. The anatomical study at once revealed a great variety in the size and contour of the bony duct. The irregularities in the surface of the osseous walls of the duct in many individuals, it was obvious, rendered them especially liable to a ready obstruction of its lumen from even slight thickening of its lining membrane from any cause.

While the duct may be large and even abnormally capacious in some parts of its course, forming lake-like expansions, in other portions bony projections or irregularities of surface contract its diameters to a narrow channel or a mere slit; or produce a tortuosity of its course which explains the difficulty which is often experienced in passing a probe into the nose, even in cases in which fluids pass quite readily. The probability of these anatomic peculiarities being present in any case of lachrymal retention should always be borne in mind, and in the adoption of methods of treatment should suggest conservatism in surgical interference. Any violent effort to force a probe through the canal in these cases may very readily cause a traumatism far more serious in its results than the disease we are attempting to cure. If, for example, the canal is tortuous, or if ledges of bone project from its walls, the end of the probe is liable to infringe upon the bony surface, and attempts to force it onward are likely to cause a tear in the lining membrane which will allow the probe to pass between the soft tissues and the bone. If these tissues are already the subject of chronic inflammation and thickening, the acute exacerbation caused by the trauma-

[1]Presented by invitation at a symposium on Lachrymal Diseases, Polyclinic Ophthalmological Society, April, 1916.

tism and the accumulation of coagulated blood between the bone and mucous membrane lead to increased thickening and a still more complete retention of the tears above the obstruction. I believe that more or less serious injury is often done in this way by converting comparatively simple or temporary cases of retention into practically incurable obstruction of the duct. After this accident the most careful manipulation is required in order to prevent its recurrence at every subsequent attempt to probe the duct. When it occurs the grating of the probe against the bone and the subsequent bleeding are sufficient evidence of the accident, and no further attempt to pass the probe should be made until the wound has had sufficient time to heal. The duct should, however, be carefully and repeatedly cleansed by warm aseptic alkaline and slightly astringent solutions. In long-standing cases the lining membranes of the duct often seem not only thickened, but spongy and friable, so that it is extremely liable to be torn or perforated, especially if too small probes are employed.

The size of the probe to be selected is of much importance. The great variation in the size of the osseous duct in different subjects suggests caution at this point. If too large a probe is forced through the passage, not only may the inflamed and friable membranes covering its wall be torn away and driven before the end of the probe, but the fragile projections of bone which encroach upon its lumen may be fractured. This certainly can be necessary in very few instances, if ever, and the results following such violence may be of more serious moment than the original disease.

The forcible dilatation of the duct and cutting operations designed to cut through or break up supposed strictures of the duct are based upon a misconception of the physiologic function of the drainage apparatus. While its function is to drain the eye of tears, the duct is not, in health, an open drain-pipe through which the tears flow by gravity, but a delicate pump, the pumping force being the act of winking. This action is disturbed by any operation which opens widely the inferior and common canaliculus up to the entrance into the sac and converts the nasal duct into a permanently broad open tube. Moreover, it gives ready access from the nose to the eye, so that in the act of forcibly blowing the nose air and infectious contents of the nostril and duct are forced back into the conjunctival sac.

How then shall we treat affections of the drainage system leading to retention of the tears? This must be determined by the existing etiologic factors and the severity and stage of the disease. In a considerable percentage of cases it is associated with, if not dependent upon, disease or anatomical deformities in the nostril, which block the lower valve-like opening of the nasal duct near the floor of the nostril, back of the inferior turbinate scroll. This probable factor should be sought for in every case of lachrymal disease. In many cases the lachrymal retention is transient. It is not infrequently a part of the symptom-complex in acute coryza or so-called "colds in the head." We now know that these "colds" are infections or toxemias, and that all the mucous membranes, whether covering exposed surfaces, as the conjunctiva or Schneiderian mucous membrane, or lining closed cavities, as in the bony sinuses, eustachian tubes, middle ear, and mastoids, are involved in the systemic state we call a cold. It would be strange if the lachrymal drainage system should escape. Clinical experience, on the contrary, proves that it does not escape, but that because of the anatomical irregularity of the walls of the nasal duct it is peculiarly liable to be closed by the edematous lining membrane.

Frequent recurrences of the condition doubtless may lead to permanent thickening and more or less permanent complete closure of the lumen of the duct in portions of its course, especially in cases in which faulty anatomical conditions favor such a result. Then, too, attacks of catarrhal conjunctivitis, or blepharitis from eye-strain or other causes, may lead to a partial or complete closure of one or both puncta and prevent access for the tears to the lachry-

mal sac and duct. This is not an uncommon cause of retained tears. I have often seen irritable eyes occasioned by this partial retention, a condition readily overlooked, since in the quiet of the consulting-room the tears may not collect but suffuse the eyes at every prolonged attempt at near work, or on exposure to wind and cold.

In these groups of patients treatment is both simple and efficient. The dilatation of the punctum, with a suitable dilator, after the instillation of a few drops of a 2-per-cent solution of cocaine, and the irrigation of the sac and nasal duct with an unirritating alkaline solution, repeated if required for a few days, is all that is needed in most cases to effect a cure. If neglected more serious conditions may result. Indeed, it is probable that the marked cases of serious disease have had their origin in neglected cases of the type described. When the tears no not flow freely through the nasal duct, their retention in the lachrymal sac makes of it a suitable nidus for infection which results in the examples of mucopurulent or purulent dacryocystitis which we are so frequently called upon to treat, and which so often prove rebellious. The relatively simple measures of treatment so efficient in the incipiency of the disease are no longer sufficient. In their management, however, I wish to call attention to the fact that in the treatment of these purulent cases we are dealing with a dangerous surgical area. I know of one case which after persistent efforts to force an opening through the nasal duct resulted in death from infection of the cavernous sinus, and another which threatened a fatal issue.

These examples have caused me to dread the possible consequences of surgery in this area in the presence of purulent disease of the sac. My own procedure is to dilate the punctum and canaliculus and wash out with a suitable syringe the contents of the sac, which usually can be made with a little pressure to escape through the canaliculi, if not through the nasal duct. A 4-per-cent cocaine solution followed by 1:5000 of adrenalin solution is carried into the sac and allowed to remain for ten minutes and then repeated. At the same time these solutions are sprayed into the nose. After the physiologic action of these drugs it will often be found possible to carry an alkaline wash through the nasal duct. When this succeeds the sac and duct are then irrigated either with a solution of silver nitrate, 1 grain to 1 ounce, to be followed in a few moments by the alkaline wash, or by a light wine-colored solution of tincture of iodine. Failing in the attempt to pass fluids through the nasal duct, twenty-four hours later the treatment is repeated. In the meantime cold compresses in acute cases are directed at home, and frequent instillations of a mild alkaline and astringent wash to the conjunctival sac. If it is still found impossible to irrigate the nasal duct, the lower canaliculus is slit, being careful to avoid cutting the common duct. A fine ductile probe with a fine bulbous extremity is then passed into the sac and a careful but persistent attempt made to pass it through the nasal duct. Failing in this, a No. 3 or No. 4 of the Bowman's series is substituted. If it does not pass without great force, the attempt is abandoned and treatment continued. It is in my experience very rarely that these conservative measures do not sooner or later succeed. When accomplished the prognosis is good for a speedy recovery. The duct once rendered physiologically patulous, the more or less chronic inflammation of the sac recovers under the stimulating and sterilizing influence of the iodine solution, repeated as frequently as may be required.

Under these procedures the treatment of lachrymal disease has lost for me its former forebodings, and my office or clinic room is no longer infested by a group of chronic cases. I look back now with curiosity as I remember the clinic bench allotted to patients sitting with Bowman's probes in their tear ducts, often so numerous that there were not probes enough to meet the demand, whereas at present a visit daily to my clinic for three or six months would never disclose a single patient with probes in the tear ducts, and comparatively rarely even the use of a probe.

THE APPLICABILITY OF BACTERIAL VACCINES IN TREATMENT.[1]

BY R. M. LECOMTE, M.D.,

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HISTORICAL.

Pasteur in 1880 began his work on induced immunity with the bacillus of chicken cholera and succeeded in immunizing fowls against the disease by means of attenuated cultures. His results demonstrated the principle of active immunization, but were of little practical value in treatment. The attempts of other investigators met with but slight success along these lines, and their efforts were turned more toward the isolation of the causative organism than to the induction of immunity. The discovery of diphtheria antitoxin by von Behring, in 1890, stimulated the study of immunization for purposes of cure and hastened the division of bacteria into the two classes according to the nature of the toxin produced. The trial by Koch of old tuberculin in the treatment of tuberculosis and the fatalities which followed the injudicious use of the method were a distinct discouragement to the study of active immunization and set its development back for several years. For some time following immunological studies resulted mainly in methods of diagnosis. Ehrlich in the late nineties assembled the phenomena of immunity as then known in his side-chain hypothesis and explained them by a single rational theory. Although since modified in some respects, it is the basis of our present-day serodiagnosis and serotherapy. Metchnikoff had in the meanwhile developed his phagocytic theory; while the observations upon which it is based are quite true, it fails to account in a demonstrable way for many of the facts as they are observed. It remains to-day to most minds as an accurate description of an incident in the acquiring of immunity, but not as a fundamental principle.

In 1904 Wright developed a technique by which he was able to satisfy himself that immunity in certain infections was due to the presence in the blood serum of bodies which he called opsonins, and which acted upon bacteria so that they could be more readily taken up and destroyed by the phagocytes. He also observed that this property of the blood serum could be enhanced by the inoculation of the patient with killed emulsions of the bacteria in question, and that this was followed by improvement or cure of the infection. By this work, although the bodies demonstrated were distinct from those described by either, he in a measure harmonized the theories of Ehrlich and Metchnikoff.

For some time treatment was carried on, using the opsonic index of the patient's blood as a control, but for various reasons this was discarded and the clinical features of the cases were relied upon as a check—in other words, the use of vaccines became empirical. In medicine, as elsewhere, each newly developed method may become a fad and consequently be abused. With certain exceptions physicians at present are of two minds in respect to vaccine therapy: either they are overenthusiastic and use vaccines in every diseased condition in which infection may reasonably be supposed to play a part and vaccines are recommended for it, or they are frankly skeptical and refuse to see any good at all from vaccine therapy. Between these two extremes there is a middle ground, and this paper was undertaken in the hope of outlining in a general way what this course should be.

The subject falls naturally into three divisions:

1. The selection of the case.
2. The selection of the vaccine.
3. The method of administration.

1. *The Selection of the Case.*—Writers on vaccine therapy customarily divide disease into acute and chronic, but seldom attempt to explain what they mean by the terms or to furnish data by which we may classify any given case. The question of the acuteness or chronicity of a lesion may be judged by either one of two standards,

[1]Read before the Georgetown Clinical Society, April 25, 1916.

the clinical or the pathological. Clinically, a disease may be considered chronic when an individual remains ill from it beyond the average time expected of a similar condition in other indivduals under like circumstances, an indefinite standard which makes it quite easy to determine when a disease is chronic or when one is acute, but leaves us no ground upon which to judge the border-line cases—the ones most difficult to classify. If we wish to use a standard based upon the pathological conditions which are set down as determining the point, we are confronted with a variety of possible circumstances which cannot be recognized from symptoms or signs or with instruments of precision, and we are again left completely in the dark. Not being able to acquire data by which we can accurately judge this point we must look to other things upon which to determine the suitability of a case for vaccine treatment. The ideal method would be a determination of the resistance of the individual and a knowledge of what would be required to overcome the infection, but since there is no adequate method of determining these points, we must seek other manifestations.

It seems rational to believe that the presence or absence of generalization of toxins in the patient's body may aid us in our determination. Theoretically, the toxins resulting from an infection may be the bacteria causing it, the products of their metabolism, elements derived from tissue destruction by the bacteria, or a combination of the three; in any case, their presence is made known to us by a symptom-complex of which elevation of temperature is recognized as the pathognomonic sign, while other signs and symptoms will vary according to the location and variety of the infection. If an infection is present and fever develops, generalization of one of the above-mentioned toxins may be taken for granted, and it may be assumed without fear of serious contradiction that the toxins are then present in sufficient amount to furnish adequate stimulation to the immunizing mechanism. If this is granted and we recognize that there is no means of estimating the quantity of this toxin present, it will be conceded that any vaccine administered will either be superfluous or of no avail, even if it does no actual harm. In immunizing animals against various bacteria and body cells, it is frequently noted that a slight overdose will make the animal very sick or may even kill him, while if the animal recovers from the effects, but little is gained in the degree of immunity produced. We believe, then, that symptoms of generalization of toxins should lead us to other methods of treatment. It may be urged that the bacteria producing the infection are not so constituted as to lead to the production of antibodies, and that this deficiency should be supplied by vaccines. If our views of the mechanism by which symptoms of infectious disease are produced are correct, namely, that they are due to the reaction of the body to the injurious substance, this objection can have but little weight. Neither is this objection borne out by practical experience in treating generalized infections, for in the majority of instances in which benefit has been claimed the vaccines used have been of the autogenous rather than the stock variety.

The variety of tissue involved by the lesion is a factor to be considered. Histologically the body is covered by a layer of epithelium in every part which comes into contact either directly or indirectly with the open air. This layer, even when diseased, is a potent factor in protection against infection and itself takes a relatively small part in any active inflammation—it either desquamates or remains unchanged. It is poorly supplied with blood, and thus is not readily reached by the antibodies present in the blood stream. The lesson to be drawn from this anatomical fact is that for vaccine therapy to be successful we must have a lesion which involves mesodermal tissue in the strict sense of the word—*i.e.*, the tissue beneath the epithelial covering. This theoretical conclusion is brought out in practice, uncomplicated catarrhal inflammations and superficial skin lesions seldom giving gratifying results from vaccine treatment. An apparent exception to this is in gonorrheal

arthritis in which vaccine therapy is almost universally successful; the pathologic mechanism of this disease is not fully understood, however, and it may be that the periarticular structures and not the synovial membranes are primarily involved.

The circumscription of the lesion is to be considered. Generally speaking the better walled off a focus of infection is, the more readily it will yield to vaccine treatment; antibodies do not penetrate a thick nonvascular pyogenic membrane readily, however, and this may furnish an obstruction to curative results from vaccine therapy.

Another factor is the ability of the bloodvessels in the surrounding tissues to regenerate; frequently old inflammations, particularly those of bone and ulcers opening upon the skin, may fail to heal because the tissues have lost their potentiality for regeneration, and while this cannot be determined beforehand, it should always be considered in estimating the end results.

Not much, then, can be expected from vaccines in a case showing symptoms of generalization, nor in one in which no mesodermal tissues are involved. The ideal case would be one without symptoms of generalization, showing fairly well-circumscribed lesions involving the tissues derived from the mesoderm.

2. *The Selection of the Vaccine.*—Although ordinarily the organism to be used can be easily determined by a culture from the infected area, in certain instances it may from the nature of the case be impossible to secure a culture; no organisms may be grown, or several kinds may be present.

When no culture can be secured and there is no means of judging from the clinical features what the causative organism may be, the selection of a vaccine on a hit-or-miss principle has nothing to recommend it in theory and very little in practice. The treatment of appendicitis, for instance, with colon vaccines can have but little rational basis beyond the fact that colon bacilli have been found associated in a causal relation with appendicitis in certain instances, and some cases have ceased to have active symptoms after inoculation with vaccines; the case in hand may be caused by an entirely different organism. It must not be forgotten, too, that the symptoms of any disease may clear up at times under hygienic and dietetic management, or may have remissions without any treatment at all.

When cultures fail to show a growth by the customary aerobic methods, anaerobic conditions should be tried. While anaerobes will be encountered only in rare instances, they should be given consideration in every case before failure is acknowledged.

When more than one pathogenic organism is present in an infected focus, it is more a matter of good fortune than of scientific accuracy in selecting the causative one, for the usual serological tests, opsonic index, agglutination, lytic test, etc., have not been found satisfactory in this application of serodiagnosis. It seems more logical to use a vaccine made up from one of the organisms present at a time, and to continue this procedure with each of the strains present until a cure has been attained or the method abandoned, than to insult the immune body producing mechanism of an individual with a mixture of all the strains contained in the culture at one time. It may be justifiable when but two strains are present, but the injection of a heterogeneous mixture of four or five varieties in the hope that one of them may be the correct one cannot be said to be conducive to the rapid recovery of the patient. The selection, even in a discriminating manner, of numerous bacteria found to have been at times associated with acute gonorrheal urethritis, acute coryza, arthritis, etc., and their inclusion in a stock vaccine and administered to the patient, can be but little more discerning than a similar procedure with the bacteria from the stool in a case of hemorrhoids or colitis would be.

Autogenous vaccines, if employed in a series of parallel cases, would probably yield a higher percentage of cures than stock vaccines, but because of the expense and time-consuming labor necessary in their

production, it is usually held to be good practice to give a properly selected stock a thorough trial before resorting to the autogenous variety.

Sensitized vaccines have given sufficient promise to warrant further trial; they have not been used in a large enough number of cases to give an accurate idea of their value in relation to the non-sensitized variety.

3. *The Method of Administration.*—Aside from the mere mechanical part of injection, this question resolves itself into one of dosage and intervals between inoculations. This would seem to be a simple problem, but the more a physician uses vaccines the more thought does he give to these matters and the more often is he perplexed concerning them.

The dosage will of course vary with the organism used, and no set rule applicable to all cases can be given. It is a good practice to use the smallest dose recommended for the initial inoculation, and to increase this dose gradually, taking into consideration the local and general reaction of the patient to the vaccine. Marked local or general reaction should lead us to advance the dose with extreme care.

The interval between inoculations should be regulated with as much care as the dosage, and when any doubt exists, no harm will be done by further delay. A fairly good working rule is not to give an injection until the local and general reaction from the preceding one has disappeared.

In the end, questions of dosage and interval cannot follow any set rule, and the individual's own experience in these matters will have to be his guiding light.

Finally, it may be that vaccines act as curative measures not so much on account of an ability to promote healing as because of their influence to prevent reinfection and to limit extension, and the value of active immunization may be altogether prophylactic. In any case, it must not be forgotten that vaccine therapy is only one form of treatment, and other methods, which were used with success before the invention of vaccines, must not be neglected.

CLIMATE IN THE TREATMENT OF PULMONARY TUBERCULOSIS.

MILLS, in the *Medical Record* of May 6, 1916, tells us that his own preference as to climate for the tuberculosis patients is New Mexico and western Texas. Many patients do well in Colorado, but it is too cold for a good many invalids.

New Mexico and western Texas have a maximum of sunshine, the greatest of all germ destroyers, and a minimum of rain. The altitude varies from two to five thousand feet, and that is a desirable factor. The air is dry and, to Mills's notion, has a distinct beneficial effect on the lung invalid. He spent nearly a year in that country for his own health twenty years ago, and he knows whereof he speaks.

The other places that are famous but nearer home he has not so much faith in. The lung invalid, if not too sick, will do better in the country away from tenements and crowded streets and city life generally, no matter where it is. But he does not believe that the true curative air is either in the Adirondacks or in the Carolinas, or in the other places that have a great reputation, except in the places he has mentioned—New Mexico and western Texas. The other places are of benefit because patients sent there are removed from vicious habits or surroundings. When he says vicious, he means physically vicious—unhealthful, not wicked. Sanatoria are numerous, but most of the health-seekers who go to them are benefited by the right living and by the care they receive rather than by the air they breathe.

In New Mexico and western Texas he believes the air itself is of curative value. In any of these places the health-seeker should place himself under the care of a local physician. That is likewise essential. Many lung invalids derive no benefit because they depend on the climate alone and do foolish things. The health-seeker should place himself under competent medical supervision in his new habitat in order that he may know how to get the greatest benefit from his new surroundings.

EDITORIAL.

OPIUM AND PERITONITIS.

Most medical men who graduated from thirty to forty years ago will recall the fact that their teachers in surgery, medicine, and therapeutics were insistent upon the value of opium in the treatment of peritonitis, and this was particularly true in the Philadelphia and New York schools, largely through the influence of Dr. Alonzo Clark, who gave opium for effect and without regard to the number of grains.

With the discovery that peritonitis is always the result of an infection, and usually a localized infection at its beginning, the attention of physicians and surgeons was called to the value of operative interference, and instead of administering opium in peritonitis, with or without operation, the surgeons went to the other extreme and strongly advocated the use of saline cathartics with the idea of depleting the intestinal peritoneum. With the discovery that this method of treatment did no good and that the caput coli in cases of appendicitis was never loaded with feces and therefore did not need a purge, this plan was also pushed aside.

Attention was now directed to the flow of lymph as a means of disseminating infection or of enabling the patient to combat his disease, and simultaneously the method of treating peritonitis by means of the rectal drip was introduced, universally recognized as of value in suitable cases, and now widely resorted to. Indeed, its use has become so popular that this method is probably employed in many cases in which it is not needed, or in which it causes unnecessary discomfort.

The object of this editorial, however, is to deal with an interesting phase of this subject which is well worthy of our attention. We have heard skilful surgeons make the public statement that he who followed the method of giving opium in peritonitis was guilty of malpractice. We have also heard others state, with equal positiveness, that he who did not give saline purges in peritonitis was equally guilty; but, with the whirligig of time, Crile now comes forward with a strong endorsement of opium, stating that the common cause of death in peritonitis, as in any acute infection, is exhaustion, which exhaustion is due to the expenditure of energy in combating the infection; the destructive effects of the resulting acid by-products; the diminished intake of food; and insufficient sleep. He emphasizes the latter factor, since in peritonitis the pain is severe, and in the acute types sleep is rare and fitful. He therefore advocates, for the purpose of diminishing the absorption of poisons and affording drainage, operating under nitrous oxide and local anesthesia combined, placing the patient in the Fowler position and giving physiological rest to the intestine. In order that the latter may be obtained, he advises the free use of opium, and thoroughly endorses Alonzo Clark's original statement that the dose should be measured by its effect upon the respiratory rate and not in grains. Crile also points out that this treatment, if properly pushed until the respirations are markedly slowed, may, by reason of the relaxation of the facial muscles, mislead the physician in thinking that his patient is worse when he is really better. He asserts that laboratory findings have demonstrated that opium protects the brain, the adrenals, and the liver against the damaging effects of toxin, and he publishes a plate showing photomicrographs of these organs exposed to infection with and without opium.

The use of opium also diminishes the need of food in that it diminishes metabolism.

Finally, Crile publishes a plate illustrating, as he thinks, the difference in the appearance of the brain cells with and without sleep after they have been exposed to a toxic agent.

Whether these plates will be universally accepted, as representng the real conditions of important organs, by those who are most competent to study them, we do not know.

The point is that clinicians of forty or fifty years ago, while they may not have been able to explain the results which they achieved by heroic medication, nevertheless were seemingly accurate in the deductions which they made. At times the laboratory investigator, the newly-fledged doctor, and the seeker after novelty are prone to ridicule methods of treatment for which there seems to be no scientific explanation, as determined by laboratory research. This has been so in the case of alcohol, where, as we have pointed out before, the belief that it acted as a stimulant was erroneous, but the observation that it did good in certain cases of disease was correct, and, therefore, laboratory experiments upon healthy men and healthy animals, which seem to indicate that alcohol was always harmful in the course of infectious diseases, while valuable in themselves, in no way prove that the observations of an immense number of clinicians to the contrary are in error.

DOES THE COMBINATION OF QUININE WITH ASPIRIN PRODUCE A TOXIC SUBSTANCE?

Aspirin, like phenacetin, is used in such large quantities by so many of the laity in doses which are even heroic, and is given on the physician's prescription so commonly, that any facts in connection with its action when used alone or in combination with other drugs possess great interest. This is the more true when a drug so commonly employed by the physician and the laity as quinine is found, in some instances, to produce a by-product which is toxic in its nature if it be mixed with aspirin. As quinine is combined with aspirin very frequently in the treatment of influenza, severe colds, and muscular rheumatism, this matter attains a position of first importance.

There does not seem to be any doubt that under certain conditions, which are as yet unexplained, the mixing together of aspirin and quinine results in the production of toxic manifestations. Indeed, it has been claimed that death has resulted from such a combination, and the *Bulletin of Pharmacy* well says that if a mixture of quinine and aspirin was the cause of death it behooves druggists to be cautious in dispensing this combination, certainly on their own initiative.

An important contribution was made to this subject by Scoville before the Detroit Branch of the American Pharmaceutical Association, and published in that Association's Journal for May, 1915, in which it was shown that decomposition of a mixture of quinine sulphate and aspirin sometimes takes place and a poisonous product is formed, to which the term quino-toxin has been applied. Attention has been called to Scoville's paper in The Digest of Comments on the Pharmacopœia.

There are a number of facts in connection with this matter which must be borne in mind before undue alarm is felt concerning it. It would seem probable that the development of such a poison rarely occurs, or, if it commonly occurs, that only a very few human beings are affected by it. Indeed, the proposition would seem to be not unlike that of anaphylaxis after the administration of diphtheria antitoxin. The development of anaphylaxis in human beings is most unfortunate, but it occurs so rarely that while the possibility of its appearance must be borne in mind it has not, and should not, in any way influence the physician in withholding antitoxin in the presence of infection by the microörganism of diphtheria. We note with interest, as we write this note, that a Commission appointed by the Academy of Medicine of Paris reports under date of February 29, 1916, to the effect that grave accidents following the primary injection, or reinjection, of antidiphtheritic serum are very rare, particularly if the injection is made into the subcutaneous tissues, and the fact that such accidents have been recorded should never interfere with recourse to serum therapy.

In all probability several hundred thousand doses of aspirin and quinine combined have been given in the last few years without any serious or harmful results.

The second point of interest is the recol-

lection that certain persons have a distinct idiosyncrasy to quinine and aspirin even when these drugs are used separately. Indeed, it may be truthfully said that quinine is one of the drugs to which a greater number of persons have an idiosyncrasy than any other medicinal substance, unless it be iodide of potash; and salicylic acid and its compounds, which are nearly related in their physiological action to quinine, may be said to occupy the third position as inducers of untoward toxic effects. The symptoms induced by quinine vary all the way from different types of skin rashes to cerebral disturbances. This also holds true in regard to the salicylates.

Under the circumstances it would seem that there is no reason why physicians should give up using quinine and aspirin in combination, but that they should be on the lookout for the development of disagreeable symptoms, and when they feel certain that these symptoms are due to the formation of a new toxic substance rather than to an idiosyncrasy to quinine on the one hand or acetyl salicylic acid on the other, they should report their experience in order that their professional colleagues may gain a correct view of this important matter.

METHODS OF ADMINISTERING ETHER.

Sometimes we are fearful that we deal too frequently in these columns with the subject of surgical anesthesia. If so, we are reflecting only the tendency of all other medical journals, and are following in the footsteps of a multitude of able physicians and surgeons. That an anesthetic satisfactory in every way has not as yet been discovered is well recognized, but it is interesting to note that, although numerous chemical compounds have been tried and advocated during the last thirty years, ether remains, the world over, the anesthetic of choice, except where climatic conditions or the exigencies of war render its use impossible.

We are presented from time to time with various plans, schemes, or modifications of methods by which ether can be administered, varying all the way from the somewhat startling idea that it can be injected intravenously to its injection into the colon when mixed with oil. Some of these methods are at once cast aside. Others find a few enthusiastic supporters, but, as the months or years roll by, it is generally found that the simplest method of administering the anesthetic, the so-called open method, is the best as yet discovered.

Again, various forms of more or less complicated apparatus are brought forward for the administration of ether mixed with oxygen for the determination of the percentage of vapor or atmospheric air, or the combination of ether and nitrous oxide, and for its administration by means of so-called rebreathing technique. Advantages for all these procedures are claimed by some and disapproved by others.

In the *Journal of the American Medical Association* of April 29, 1916, Dr. Isabella C. Herb, a professional anesthetist, discusses the question of ether administration and advocates simplicity in its use. She emphasizes the value of the open method, so that the ether is given very much as chloroform is sometimes used, the covering of the eyes of the patient by wet cotton to protect them, and the giving advice to the patient as to how he, or she, shall breathe. She evidently is an advocate of the simultaneous administration of oxygen, and she is careful to point out that the ether cone should not be placed upon the face until the patient becomes accustomed to the odor and sufficiently under the effect of the drug not to have a sense of strangling or suffocation combined with fear. She also advocates the turning of the head to one side as soon as the patient is sufficiently relaxed to make this possible, as this prevents the tongue from falling back into the pharynx and obstructing respiration.

Concerning the warming of ether vapor before it is given, she comes to the conclusion that there is no distinct advantage in such a procedure.

With the above method of etherization there is no difficulty in maintaining a well-oxygenated state of the patient's blood, be

the operation what it may. By the avoidance of too concentrated a vapor injury to the epithelium of the lung is avoided. And, finally, she insists upon one point not sufficiently recognized, and yet obvious, that the anesthetic state should resemble normal sleep, and that simplicity in the administration of ether, as in all other forms of technique in medicine, is desirable.

THE SOLDIER'S FOOT AND THE TREATMENT OF DISABILITIES.

Of the many contributions to current literature from the war zone few are of greater value, both to the military surgeon and to him whose country is at peace, than those of Jones (*British Medical Journal*, May 30, 1915), whose teaching, based on an enormous experience, is characterized by a sound common sense and a keen appreciation of the methods which promise swift and lasting cure.

He notes that hallux rigidus and hallux valgus are frequently combined with some impairment of the transverse arch which is specially apt to be associated with the painful condition known as metatarsalgia.

Impairments of the longitudinal arch are associated with a train of symptoms found in weak foot, inverted foot, and flat foot. All these types of derangement of the mechanical elements of the foot and the resultant disabilities depend upon strains about the complicated series of joints in the fore part of the foot.

In the hind part of the foot the disabilities are fewer and are mainly connected with painful conditions of the heel, due in the main to such conditions as strain of the insertion of the tendo Achillis, or periostitis of the os calcis, often of traumatic origin.

By the term flatfoot is meant strain of the longitudinal arch. The essential fact in the deformity is abduction and eversion of the fore part of the foot. If it commences as a sudden acute condition it is associated with strain of the inferior calcaneo-scaphoid ligament; to this is due the tenderness elicited on pressure on this ligament just below the tubercle of the scaphoid. This tenderness is characteristic. Pain is often most acute in patients having a high arch and denotes the beginning of the giving way of this arch.

Acute flatfoot may occur in recruits or in nurses returning to duty too soon after illness. Rest and massage are indicated during the acutely painful stage—this for two or three days. There must be no weight-bearing allowed. Thereafter adduction and inversion so as to restore the arch and allow stretched ligaments to shorten. The foot should be molded into correct position and fixed in this by plaster of Paris for ten days to accomplish these ends. Thereafter comes exercise, particularly inversion movements and movements of the toes. The patient is gotten up on shoes roomy for the fore part of the foot, gripping the ankle closely, with a straight inner side and the heels built up one-third of an inch higher on the inner side, tapering gradually to the outer side. The heel should be extended forward on the inner side, and the sole should also be raised one-third of an inch, nor should the patient ever put his foot to the ground without an altered boot or shoe on, otherwise he will unwittingly let his arch descend and so inflict a fresh strain on the ligaments.

Thereafter the man should be instructed to walk with the feet parallel; not with the toes turned out. The walking exercises should be gradually increased. A pronounced case should not be ready for full duty for six weeks, and not then unless his shoes are properly prepared. Recruits with weak feet should be started off with heels raised on the inner side until the muscles get into training. They should also be taught to walk with their feet parallel.

Traumatic flatfoot is an acute condition similar to that just described, excepting it is produced by a sudden force, as for instance the weight of a trap running over a man's foot and straining all the ligaments.

A periarthritis, such as accompanies gonorrhea, for instance, or an ordinary septic infection, characterized by ligaments sod-

den with exudate, allows stretching under even a moderate strain.

If the acute stage of flatfoot be neglected and no effort be made to maintain the foot in an adducted and inverted position, on recovery the ligaments will be in a flat-footed position with stiffness in all the joints. Patients cannot stand on the outer edge of the foot or turn it into an arched shape.

The foot should be wrenched so as to break down all adhesions and make it thoroughly pliable. It is by this means converted into an acute traumatic flatfoot, and should undergo the course of treatment described for that condition.

A flatfoot neglected for many years becomes an "osseous flatfoot"—that is to say, changes occur in the shapes of the bones to adapt them to the erroneous position. These people cannot be made competent soldiers.

Flatfoot due to spasms of the peroneus occurs after puberty and in early adolescence. The patient will have a springless gait, walking with the feet practically rigid and with the toes pointing out. They are both everted, and the inner border over the region of the scaphoid appears thickened and even angular. The character of the walk and the appearance of the feet suggest ossous changes. On being questioned the patient may give a history of injury, such as a fall on the feet; usually he cannot account for it. The pain is often acute, the feet may perspire abnormally, and the patient may not be able to walk more than a short distance. Relief is experienced on removal of the boots. If the patient is asked to invert his foot he cannot do it, and when he attempts to do so the peronei become rigid. The surgeon when he examines the foot manually finds there is pain on pressure over the deltoid ligament, over the scaphoid, and over the tip of the external malleolus, where it impinges upon the os calcis, and tenderness over the peronei along the outer border of the foot. An attempt to invert the ankle causes pain and the peronei strongly resist the effort. The spasm may be overcome by distracting the patient's attention whilst the foot is gently pressed in the direction of inversion, and then at the psychological moment, while the peronei are quiescent, very suddenly inverting the foot and holding it there. This shows osseous changes absent whilst it is held. This condition will not be benefited by mechanical measures. The patient must be anesthetized to relax all spasm, and about three-quarters of an inch of each peroneus should be removed about an inch and a half above the malleolus. The foot must then be fixed for about three weeks, well inverted and adducted at the midtarsal joint, followed by the ordinary treatment for flatfoot.

Subacute flatfoot in the ordinary form is characterized by painlessness after moderate use and pain on unusual function. There is distinct tenderness on pressure below the tuberosity of the scaphoid; there may or may not be pain in other regions. The patient will stand on the outer edge of his foot and can crook his foot into the arched position. This is important, for it means that the patient will recover if the heels of his boots are crooked so as to deviate body weight on to the outer side of the foot.

Exercises and contrast baths—that is, hot and cold water alternately—are useful. If the principle of deviation of body weight on to the outer edge of the foot be intelligently carried out, the usual flatfoot is curable. Even in the bath the patient must be careful to stand on the outer edge of the feet. The whole idea of the treatment is to insure that uninterrupted adaptive shortening of stretched structures shall take place.

A few minutes careless walking in stocking soles will undo all benefit from other treatment by again stretching recovering structures.

Frequently the high arched foot is the most troublesome type when the tendons are strained and the ligaments begin to give. The strain upon the astragalo-scaphoid joint in this type is, for obvious mechanical reasons, great, and the progress of the affection is often marked by a prominence about the scaphoid due to pressure osteitis.

THE LOUSE AS AN ARMY PEST.

The numerous references to the lousiness of the soldiers constituting the armies now arrayed against each other have as a rule implied that this condition is one of discomfort rather than one fraught with any actual menace to health. The irritation caused by the crawling and biting insect can scarcely be conducive to sound sleep or to good temper. Moreover, the intense itching attendant on these bites necessarily leads to a scratch dermatitis.

The subject has been taken up with true scientific acumen by Peacock (*British Medical Journal*, May 27, 1916), lecturer in zoology, University of Durham, who has studied the clothes or body louse, the *Pediculus humanus*, morphologically by first chloroforming the insect, and thereafter fixing it in formalin. Both black and gray were noted; eighteen hundred lice counted yielding 5.4 per cent black.

The casual observer may be led into error; attention is called to the wood louse, or slater, a crustacean related to the crabs and lobsters, probably an ancestral or originative type of louse, and strongly resembling the latter when at rest. Springtails, which move by leaping, and certain small beetles may be taken for adult lice, and small mites, relatives of the spiders, look like young lice. These mites are very common in food which has been trodden into empty sandbags on the floors of dugouts.

For shelter the louse prefers the quiet, warmth, humidity and comfort of the seams of the clothing, the shirt by preference, though in many cases most eggs were found at the fork of the trousers.

Human blood is the insect's food; the adult may suck for twenty minutes at one time. It is a voracious and wasteful feeder, the excreta often consisting of what appears to be undigested human blood, peristalsis being violent. It feeds as soon as hatched, and pours out saliva which prevents the clotting of the blood.

In copulation the male lies below the female; the penis, being extruded and upcurled, is retained in position by the gonopods of the female. The latter lays five eggs at a sitting and may produce a total of 125.

If taken away from the body for two days the louse becomes moribund. The maximum time during which eggs may remain dormant has been found by Warburton to be about forty days. Hence it follows that eggs on garments not treated by ironing and disinfection are possible sources of infestation for as long as a month after laying; and the removal of the clothing from the body for a few days in order to kill the eggs and lice by exposure is not a practicable scheme.

It is true that the louse is a parasite which is utterly dependent upon man's blood for sustenance, and man's body and clothing for prolonged, prosperous longevity and reproduction.

The ingenious author charted the peregrinations of four lice, which showed they were astonishing but aimless wanderers. On a shirt in the condition termed "walking" were computed 10,000 living lice. Though lice may leave the body of a host or go to one who sleeps on infected bedding, a deliberate effort to reach a human body or recently discarded and sweat-impregnated clothing was not observed in the captive insect. The instinct of pursuing the host seems to be a feeble one.

Peacock established standards of lousiness and publishes graphs illustrating the degree of infestation. Ninety-five per cent of the men examined were infested, while five per cent were what are called maximum cases.

It might be expected that soldiers living in the bare trenches, where no dugouts exist, would be more free from lice than those living in dugouts. This was not found to be the case. There was a general impression that the dugouts were swarming with lice. A careful examination of these dugouts failed to discover a single living louse. It is, therefore, obvious that the dugouts play a minor part in the harboring and disseminating of the parasite. It is also true that blankets are of minor im-

portance as harborers and centers of dissemination.

As to how the parasite first gained a foothold in the army at the front, they were probably carried by the recruits coming from verminous slums, mingling with their fellows under circumstances which did not allow of frequent cleansing. The conditions for rapid propagation were favorable and taken advantage of by the insect.

As to the study of the methods of prevention and of destruction of the insect, the insecticides are classed according to the killing efficiency as measured by the sum of the percentage of insects destroyed in a certain time. The general efficiency is measured by the sum of the percentage of insects killed, evacuated, and unaccounted for in a certain time, and as to the deterrent efficiency this is measured by the percentage of insects which the insecticide deters from reaching the body.

Of the various agents tested the N. C. I. (naphthalene 96 per cent, creosote 2 per cent, iodoform 2 per cent) is the best all-around germicide used. The author in his scientific enthusiasm placed 700 vigorous lice in a sleeping-bag improvised from a blanket, and used the N. C. I. preparation on his shirt back and front, on his riding breeches at the fork and as far down as the knees. Socks instead of puttees were worn, the shirt neck was opened, and the sleeves rolled up as far as the elbows. Almost immediately after settling in the sleeping-bag lice were felt crawling in great numbers in the socks, on the arms, and a few at the neck—that is, those parts of the clothing and body not treated with the powder. Next morning 155 dead lice were shaken from the socks, 30 dead lice were found below the breeches' knees; one was found at the thigh; no lice were found on the shirt. The powder was a complete deterrent.

Vermijelli was also found to be highly effective, the body being anointed from neck to knees. Local applications seemed only to cause the lice to migrate to those parts of the body not treated. A still more powerful ointment was made by melting two pounds of soft paraffin with two ounces of crude tar oil. The N. C. I. and vermijelli, the latter being smeared at the fork of the trousers and the seams, the N. C. I. being dusted down the shirt and trousers, were entirely efficient, the efficiency lasting from three to seven days. Mercury ointment, white mercury powder, and sulphur were not efficient.

The author suggests a research center and the formation of classes for the study of the louse, his habits and his weaknesses; also the issuing of a short and very sensible leaflet on the use of divisional baths, the sterilization of all clothing by heat and steam under pressure, and the vigorous following up on the part of proficient men in a definite campaign against the pest.

Bacot, entomologist to the Lister Institute of Preventive Medicine, studied both the body and head lice, which he kept in small entomological glass-bottomed boxes, the lids being removed and fine silk gauze stretched across the open ends in their place. The insects fed readily through the gauze when this was placed against the skin. These boxes containing the lice were carried in waistcoat pockets. The insects had approximately from six to seven hours daily during which they could feed. It was noticed that when opportunities for feeding through the day were afforded the egg production was increased. Interesting experiments were carried on in cross-breeding which seemed to be entirely successful. He noticed that pairing took place at any hour, and a male of the body louse fertilized 18 out of 20 females placed in succession. The head louse seemed less fertile, although on four trials ten females were fertilized, and he might possibly have equaled the record of the body louse but for the scarcity of virgin females while the experiment was in progress. The body louse retained the power of laying fertile eggs for twenty days after removal of the male, and in one instance laid 295 eggs. The highest record for a head louse was 141. The average life of the louse is about a month, for hybrids about the same, and the latter reproduce as freely as the pure bred.

Two days' freezing temperature was not lethal to active specimens. Estimating the egg period as twelve days, and a further twelve days to the maturity of the females, allowing an average of eight eggs per day, spread over a fertility period of forty days, we find that during her life a single female may have 4160 offspring.

Half an hour's exposure to a temperature of 55° killed both active lice and their eggs.

Dalmatian insect powder in the fresh condition has a definite insecticidal action, killing all lice immersed in it in a period of two hours. Exposed to air, however, the powder quickly loses its value. It seems conclusively shown that commercial naphthalene is more efficient than freshly powdered pure naphthalene, and that the lethal power of this drug is dependent upon the presence of hydrocarbons and coal-tar derivatives other than pure naphthalene.

It would seem from army experience that lice are rarely acquired from bedding; that once acquired the body louse can be gotten rid of only by thorough disinfection of the clothing; that this is best accomplished by heat, the sufferers in the meantime bathing; that if heat be impracticable commercial naphthalene is an efficient insecticide.

SOME SURGICAL LESSONS OF THE WAR.

The readers of the THERAPEUTIC GAZETTE will doubtless have noted that considerable space has been given to the consideration of the treatment of the wounded in the present war as evidenced by current literature in the form of reports of those surgeons who have been to the front. Hypertonic solution, bags of sodium chloride, Dakin's solution, the use of electric lights, all have their enthusiastic advocates, but none have received that general acceptance which betokens efficiency. Therefore, a visitor to a dozen hospitals on any battle front will find that, insofar as antiseptics are concerned, half a dozen different ones are used, and perhaps in a considerable number of these hospitals a total rejection of all antiseptics, hypertonic solutions, and everything but normal salt solution. There is a general consensus of opinion, as carried both by word of mouth and in written communication, to the effect that the most efficient treatment of badly infected wounds is by the continuous bath, and there is a universal belief in the efficiency of thorough and complete drainage and the desirability of local cleanliness. There is a growing belief in the value of pain or its absence as an index of the injurious or beneficial dressing. There exists also a well-founded concept of the danger of drainage tubes across blood-vessels. There seems to be a general feeling that the chlorinated solutions tend to encourage secondary hemorrhage. A slight tendency is noted toward an elective choice of antiseptics in accordance with the particular form of infection. The fact is well established and generally recognized that plastics on the healed cases of virulent infection do badly, and that a clean wound is essential to the success of a plastic. There is a growing tendency toward prompt intervention in penetrating wounds of the chest and belly, but the fact remains that the best results are incident, not to a particular antiseptic or treatment, but to the judgment, experience, and sound common sense of the surgeon applying the broad general principles of relief of tension and free drainage.

REPORTS ON THERAPEUTIC PROGRESS.

PERFORATION IN TYPHOID FEVER.

The *Official Bulletin of the Chicago Medical Society* of May 13, 1916, reports a summary of a paper by EDDY in which, after a thorough review of the literature, he discussed the differential diagnosis and treatment of typhoid perforation.

With reference to the treatment, he said that there is only one method in these cases requiring discussion, which was well stated by Mikulicz in 1884 when he said: "If suspicious of perforation, one should not wait for an exact diagnosis and for peritonitis to reach a profound degree, but, on the contrary, one should immediately proceed to an exploratory operation, which in any case is free from danger." How much more true the above statement is in present-day surgery is well understood. Our patient's life depends on the recognition of the perforation, and not the resulting peritonitis, and unless we are capable of doing this we are a stumbling-block to the patient's welfare.

As soon as perforation is recognized, or greatly suspected, the patient should be given morphine immediately. Quoting Morris: "We are choosing the lesser of two evils, for the tremendous shock is more deadly than are the escaping bacteria when not quieted by opium."

There seems to be a difference of opinion as to the choice of anesthesia. Woolsey believes that these cases take gas and ether well. In two cases reported by him, cocaine was used satisfactorily for exploration, but retraction of the edges and the necessary handling of the inflamed bowel were painful, and this, together with the realization of being subjected to an operation, causes more shock than general anesthesia.

As to choice of incision, most surgeons will agree on the right rectus, or McBurney's, as statistics conclusively show that over 80 per cent of the cases perforate in the lower eighteen inches of the ileum, and the nearer we are to the lateral wall the less the danger of spreading the infection over the peritoneal cavity. The perforation should be located as quickly as possible and with little handling of the bowel.

The perforation can be closed in most cases with a purse-string reënforced with a row of Lembert or mattress sutures; the greatest care being taken, however, not to constrict the lumen of the bowel, which, if done, will almost certainly result in ileus. In all cases the ileum should be explored as far as the inflammatory process extends for multiple perforations or deep ulcers. Some cases may require resection where the perforation is large, but unfortunately the quickly resulting peritonitis and extreme shock of such an extensive procedure have proven fatal in nearly all cases of this character reported in the literature.

The peritoneal cavity should be carefully sponged with saline solution, but avoid irrigation unless a general peritonitis exists. Thorough drainage should be employed and the Fowler position obtained as soon as the patient's condition will permit.

Intravenous or subcutaneous injection, or proctoclysis, should be used according to the demands of the patient's condition. Morphine should be continued until the peritonitis becomes well localized and the bowel not disturbed in any way. Later they should be taken care of by flushing and small doses of eserine. No food whatever should be given by mouth, and if vomiting has been quite severe, lavage should be used before the patient comes from under the anesthetic. Stimulation should be used according to the demands of the patient, and the condition of the heart muscle carefully observed.

In conclusion, the following deductions may be drawn: (1) While perforation varies greatly in different epidemics, about 12 per cent of the total death-rate is due to this complication. (2) That perforation occurs in about 3 per cent of all cases treated. (3) That perforation is relatively infrequent in children. (4) Statistics show that over 80 per cent of total perforations occur in the lower part of the ileum. (5) That this location of perforation coincides with the study of Baer. (6) That the majority of cases perforate during the second and

third week. (7) Diarrhea is an important factor in its production. (8) Acute abdominal pain during the course of typhoid should always be taken seriously. (9) The sudden rise of blood-pressure is positive evidence of perforation, while an unchanged pressure is not of negative value. (10) The importance of a careful study of the blood cannot be overestimated. (11) The welfare of the patient depends on our ability to differentiate between the symptoms of perforation and those of the resulting peritonitis. (12) The treatment of perforation is surgical, and the death-rate is in inverse ratio to the length of time allowed to elapse before operation. (13) Opiates are indicated as soon as perforation has taken place, and should be continued until the peritonitis has become well localized.

THE RELIEF OF CHRONIC OBSTRUCTIVE JAUNDICE BY PALLIATIVE OPERATION.

In the *Official Bulletin of the Chicago Medical Society* of May 13, 1916, ERDMANN states that the object of his paper is to review the literature pertaining to obstructive jaundice and to offer suggestions for the operative relief of chronic cholemia; that the paper considers only those cases of biliary and pancreatic obstruction which are incident to malignant disease or nonremovable tumors about the terminal portion of the common and pancreatic ducts.

The clinical picture of chronic obstructive jaundice is well known. The relief of biliary stasis must be provided by a drainage operation between some portions of the biliary apparatus and the gastrointestinal tract. The indications for operation in malignant obstruction to the biliary flow may be summarized as, first, mistaken diagnosis; secondly, the relief of distention pain; thirdly, intractable pruritus; fourthly, social; fifthly, surgical euthanasia.

A neoplasm at the ampulla of Vater will bring about not only biliary obstruction, but a variable degree of pancreatic obstruction. Cholecystenterostomy will deliver the biliary secretion or excretion into the intestinal tract, but would only rarely affect the pancreatic secretion. In spite of the elimination of jaundice and the biliary stasis by cholecystenterostomy, many of these cases may result in more or less rapid death as the result of pancreatic insufficiency.

Any chronic obstructive condition of the duodenum at or below the ampulla of Vater will introduce additionally the signs of pyloric stenosis. In obstructive conditions at the ampulla of Vater it is usual to find the gall-bladder distended with bile. This is not necessarily always the case, as a distinct hydrops and a well-dilated common duct filled with mucoid fluid have been observed.

The most frequent obstructive condition is from carcinoma of the pancreas, ampulla, or duodenum. Seventy per cent of cancers of the duodenum are carcinomata of the ampulla of Vater. Pancreatic cancer is the most rapidly fatal of any form of carcinoma. Up to August, 1915, 22 cases of excision of growths at the ampulla have been reported, and the results are not encouraging. Under most circumstances operative intervention will be in the nature of a palliative proceeding to provide drainage for the biliary secretion. For an obstructive condition of the common duct or its terminus we have a choice of operation, of which an anastomosis between the gall-bladder and some nearly approximate portion of the gut tube is physiologically and anatomically correct. The choice of a particular operation will depend upon a number of factors—one, the physiological efficiency of the procedure; two, the ease of technical accomplishment; three, the relative immunity from ascending infection; and four, the immediate and remote effect upon the metabolism of the patient The classical operation of cholecystduodenostomy simulates the natural conditions of biliary drainage better than other types, but its mortality is higher than cholecystogastrostomy. The biliary portion found most convenient is the gall-bladder. The best results are obtained from cholecystogastrostomy. There is no objection to the presence of bile in the stomach. Cholecystenteros-

tomy carries with it possibilities of angulation. On theoretical grounds the union between the colon and gall-bladder is to be deprecated, and on other grounds as well. However, in spite of certain manifest defects, in a certain series the early cholecystocolostomies have a longer period of postoperative longevity than any of the other early cases.

In a few cases of operation on pancreatic disease it has been observed that the patient reacts well up to thirty-six hours after operation; then ensues a rapid fall in blood-pressure, cold, clammy perspiration, and diminished urine, showing acetone and diacetic acid. By means of continuous proctoclysis and saline infusion, urinary elimination is increased and the patient improves. In some of the deaths that occur after operation the element of acidosis is present.

The essayist reported a case of carcinoma of the duodenum and papilla of Vater; cholecystostomy and posterior gastroenterostomy; secondary operation, cholecystojejunostomy, with recovery. Also a case of carcinoma of the duodenum with biliary obstruction; transfusion; posterior gastroenterostomy and cholecystogastrostomy, with recovery.

A case of carcinoma of the common duct, cholecystogastrostomy, with death. A case of carcinoma of the pancreas, hepaticoduodenostomy, with death. Carcinoma of pancreas, cholecystocolostomy, with recovery.

Carcinoma of pancreas and ampulla of Vater; posterior gastroenterostomy; cholecystostomy, with recovery. Secondary cholecystocolostomy, death.

Carcinoma of pancreas, hydrops of gall-bladder; cholecystostomy; choledochostomy, death.

Conclusions: (1) All cases of obstructive jaundice are entitled to operative consideration. There is a certain definite percentage of cases that are cured because there has been a mistake in the diagnosis. (2) Any of the above operations are not prohibitive, considering the severity of the disease and its hopeless outlook. (3) The immediate relief from itching, in addition to the prolongation of life, is an exceptionally strong argument for operation. (4) Operation obviates the development of "pressure pain" from increasing distention of the biliary apparatus. (5) These operations are advised solely as palliative procedures, and as such their purpose must be clearly understood.

THE OCULAR CAUSES OF HEADACHE.

In the *Albany Medical Annals* for May, 1916, BEDELL reaches these conclusions:

1. Ocular headaches may be the result of a refractive muscle error or local inflammation.

2. Ocular headache, although most common in the afternoon, may be at any time of day or night.

3. The headache of middle life demands careful ocular examination.

4. Ocular headache may be present even with perfect distant and near vision.

5. In no case is the eye excluded until a cycloplegic has been used.

6. Occipital pain and nape of the neck discomfort extending even to the shoulders is often of ocular origin.

7. When proper, correct lenses are ordered, they must be worn as directed and must be accurately placed before the patient's eyes.

THE DIABETIC QUESTION.

In the *Journal of the American Medical Association* of May 13, 1916, ALLEN, whose methods of treatment of diabetes we have already called attention to more than once, tells us that in the practical therapy of acidosis it is still a wise general rule to use alkalies and other customary measures at the outset, though under proper conditions and with adequate tests of the acidosis nearly all cases can be managed without alkalies. If alkalies are used the dosage can be smaller than formerly employed for threatened coma, and the injurious or dangerous effects of the large doses may thus be avoided. For the average patient, a proper fasting and dietary régime quickly

obviates the need for alkalies. For the occasional patient who reacts badly to fasting, the practice of Allen is not to resort to excessive doses of bicarbonate, but to terminate the fast by giving restricted diet. After a week or two of such diet a second fast has regularly proved successful. In no case is an alkali given for more than a very short period, and the ideal in all cases is to prevent the formation of the acid substances rather than to attempt to neutralize or eliminate them by means of sodium bicarbonate.

Leaving this digression concerning acidosis, let us return to our original question, What is diabetes? If it springs from deficiency of the internal secretion of the pancreas, what are the results or manifestations of this deficiency? The most obvious fault is in the sugar metabolism; here the distinctive feature of diabetes is not glucose in the urine, but diminished power to use glucose. But diabetes is probably something broader than this. The normal person eats food, digests it, and absorbs it into his blood, and his cells assimilate it for their nutrition. The diabetic eats, digests, and absorbs normally, but does not assimilate normally. Diabetes may probably be defined as a specific deficiency of the power of assimilating food.

The question may be pushed further: What is the mechanism of this power, the reason for this deficiency? Concerning this Allen has previously proposed a tentative hypothesis of "binding substances." The hypothesis is merely suggestive. It is entirely without chemical support. But since chemical methods have not yet been able to grasp the problem of the mechanism of diabetes, the negative chemical evidence is not decisive. In addition to the previous observations concerning the diuretic action of sugar, the following may possibly have some connection with this idea of the ability of cells to bind food substances. First, the accumulation of reserves, as when the body gains weight, diminishes tolerance and aggravates diabetes; whereas the reducing of the reserve stores, by low diet or by exercise, increases tolerance and checks diabetes. Second, any kind of food—except apparently alcohol, which has no storage form—weakens the assimilative power for other foods. Adding carbohydrate to a diabetic diet may give rise to ketonuria. Adding fat to a diabetic diet may give rise to glycosuria. This fact was partially obscured when it was the practice to give diabetics carbohydrate for the sake of relieving acidosis. Certainly an excess of carbohydrate, by forcing combustion of carbohydrate and also diminishing combustion of fat, may temporarily diminish ketonuria; but the injury to the patient's actual functional capacity is still evident. After a sufficient period of carbohydrate excess, there is greater ketonuria than before on the same diet as before; and it is difficult to maintain that ketonuria is due merely to lack of carbohydrate. The true conditions are more clearly observable under the fasting treatment.

The history of diabetic therapy, so far as it is significant or valuable, consists merely in an interweaving or alternation of two principles. One is restriction of the sugar-yielding elements of the diet, namely, carbohydrate and protein. The other is diminution of the total caloric value of the diet. The latter is the older. Willis reported benefit from a diet limited to milk and barley-water cooked with bread. There have been milk and vegetable cures since then; but whereas the authors aimed at a non-toxic diet, what they really achieved was undernutrition. Then came Rollo with his notion of animal food to strengthen digestion, and thus the benefit of carbohydrate restriction was accidentally discovered. The harmfulness of excessvie protein-fat diet was soon recognized, and Bouchardst, Cantani, and Naunyn introduced fast-days and lower diet. Then came the ritual of von Noorden's oat cure, and the widespread ideas concerning special properties in oatmeal, which ought not to have gained credence among those acquainted with the literature of previous carbohydrate and vegetable diets. Blum broke the spell by having the courage to declare that oatmeal is like any other form of starch; and then

straightway others made the test, and it became established that there is no special virtue of any kind in oatmeal. The oat cure gave patients a few days' rest from protein-fat excess by substituting carbohydrate excess. Its advocates claimed that it avoided the undernutrition characteristic of other carbohydrate cures, by making up a diet adequate in protein and calories on the oat days; but the undernutrition was present in the fast-days or vegetable days preceding and following the "cure," and therein lay the principal benefit. The oat cure merely shows that a large proportion of diabetics still manifest a surprisingly high carbohydrate tolerance when conditions are not too unfavorable. It is a failure in genuinely severe cases.

The fasting treatment has been previously outlined, and details will be published later. It remains true that diabetics with the severest type of the disease have been permanently freed from glycosuria and ketonuria. There have been deaths from complications and accidents before treatment could be completed, and physicians will be able to judge concerning these when the details are published. No complication has appeared in any case after treatment unless the one death from tuberculosis be classified here. Five patients broke their diet and are dead. In the others, who have followed the diet, no inherent downward tendency has yet been observed, and progressive improvement seems to be evident in the majority. The longest observation is now only twenty-one months, so the ultimate results are still subject to question. It would not be strange to find that some severe diabetics have too little assimilative function left to maintain life, but thus far it has been possible to avoid such a confession. To some extent the tolerance, but especially the general well-being, of the patients has been improvd by the introduction of vigorous exercise, and most of those treated are now earning their living. It is hoped that a real reduction of the mortality of diabetes will be possible; but if ultimate results disappoint this hope, the treatment is justified by the benefit to the comfort and usefulness of the patients. It is in harmony with the observed benefits of carbohydrate restriction and undernutrition in the past history of diabetes, and it makes an efficient application to diabetes of one of the best established principles of all therapeutics, namely, rest of a weakened function. What is further desirable is obviously some positive means of strengthening the weakened function; but no such method has yet been discovered for diabetes.

THE TREATMENT OF PYORRHEA ALVEOLARIS AND ITS SECONDARY SYSTEMIC INFECTIONS BY DEEP MUSCULAR INJECTIONS OF MERCURY.

WRIGHT in the *Medical Record* of May 6, 1916, points out in discussing this subject that besides the bacterial infection there is a second factor that requires every consideration, viz., that in a very large majority of cases calcareous deposits occur to a greater or less degree along the roots and necks of the teeth, which, acting as foreign bodies, are a constant source of irritation. It is therefore obvious that in order to cure this disease in a large majority of cases two courses of treatment must be pursued at the same time: (1) The infecting organism or organisms must be attacked by the use of some parasitotropic agent, and (2) during the administration of this agent surgical interference must be resorted to locally, all calcareous deposits and tartar wherever found being removed, and the toilet of the oral cavity made as perfect as possible.

The multiplicity of the organisms productive of this infection makes it necessary to select for systemic administration an agent parasitotropic to them all. That mercury in proper doses and properly administered has this qualification when the vegetable parasites are in question, Wright has repeatedly demonstrated.

If it is found that the entameba buccalis is the primary causative factor of pyorrhea, Wright's results and the observations of Price and Riethmüller would show conclu-

sively that mercury is also parasitotropic for this particular protozoan at least.

In this disease, in the male patient, a deep muscular injection of mercuric succinimide, 1 grain (65 mgm.), should be administered every seventh day, until the discharge of pus has entirely disappeared, and the gums have regained their normal condition and appearance. In female patients the dose should be from 1/5 grain (13 mgm.) to 2/5 grain (26 mgm.) less than that administered to males. Mercurialism of any marked degree should be met with smaller doses at succeeding injections, or, if the symptoms are severe, the mercury is discontinued until they have disappeared.

The syringe used is all glass, and holding forty minims. The needles used are No. 26, intramuscular, for the above syringe.

Syringe and needle are sterilized before using. The solutions are so made that 1/5 grain of mercuric succinimide is dissolved in four minims of hot, sterile distilled water.

The site of injection is the buttock, using alternating sides for succeeding injections. The skin is sterilized with tincture of iodine. The method of inserting the needle is as follows: The needle butt is held between the thumb and third finger with the index-finger over the butt, the shaft of the needle to be perpendicular to the skin surface, the point about three inches distant from it. With a quick, forceful, downward thrust the needle is driven deeply into the substance of the gluteal muscles, from point to butt. Then into the syringe as many minims of the sterile mercuric solution as represent the desired dose are drawn; if it is to be 1 grain, 20 minims will be required. Then the syringe tip is inserted into the socket of the needle, and the injection is made slowly. The needle is withdrawn, and tincture of iodine is applied to the point of injection. The injections are to be repeated every seventh day.

The local treatment as administered by Dr. P. G. White embraces the following steps: Careful expulsion of the pus from the pockets; thorough removal of calcareous deposits and tartar wherever found; extraction of hopeless teeth and roots; polishing of the tooth structure, followed by applying to the margin of the gums equal parts of tincture of iodine, tincture of aconite, and chloroform, continued every other day. This latter procedure may be and has been omitted in many of Wright's cases without any appreciable difference in the time required to effect a cure, but Wright considers it a valuable adjunct to the local curettage and systemic treatment.

The longest period of time required to effect a cure was forty-one days, the shortest four days; average seventeen days. The greatest number of injections required to cure the primary infection in any one case was seven, the smallest number one; average 2.9. The diagnosis in each case was based upon classical symptoms and conditions; pus was present in every case, the presence of slight pathological changes in the gum tissues, or of any particular organism, not being considered as diagnostic.

THE TREATMENT OF CARDIAC SYPHILIS.

In the *New York Medical Journal* of May 6, 1916, ANDERS tells us that the majority of the cases of cardiac syphilis which he has treated either in hospital or private practice have been late cases, typical instances for the most part of aortic regurgitation in decompensation, and equally typical ones of myocardial degeneration independent of aortic incompetence. In the management of these cases, in many of which dropsy has supervened, the usual circulatory indications are to be met, as under other circumstances. For example, complete rest of body, hygienic and therapeutic measures, such as digitalis and other cardiants, are all to be enjoined, with modifications to suit individual cases. It cannot, however, be denied that these agencies fail to afford as satisfactory results as in non-syphilitic cases of cardiac disease.

Assuming the Wassermann reaction to be present, how shall the syphilitic element be attacked in these late cases? Shall sal-

varsan be employed in aortic incompetence after decompensation has appeared? There are two small classes of cases in which the use of salvarsan is, to the writer's mind, quite justifiable: (1) In myocarditis and aortic insufficiency in which the actual condition of the myocardium is indeterminable, but obviously not degenerated to a marked extent; and (2) cases occurring in patients who urgently demand that something be done to afford relief from their sufferings. Stone has invited attention to two cases belonging to the latter class in which the distressing symptoms were minimized by the use of salvarsan.

In well-marked cases of syphilitic myocarditis and aortic incompetency due to the same cause, it is the writer's custom to give mercury a prolonged trial by inunction, and this failing, by the hypodermic method. If this does not yield a favorable result—*i.e.*, a negative Wassermann reaction—then salvarsan is used intramuscularly, at first, however, in small doses. In this group of cases the injections of salvarsan are to be followed by a period of absolute physical rest. Ehrlich, quoted by Held, emphasizes this point, stating that it is an important factor in the treatment with salvarsan of cardiovascular conditions dependent on syphilis. All such cases should be treated in a hospital, and Held properly recommends that the patient be kept at rest for from twenty-four to thirty-six hours—in instances of myocardial degeneration not less than two weeks—and subjected to all other measures entering into the routine treatment of this condition.

Anders agrees with Daland that the intravenous method of administration of this agent is too hazardous to life to permit of its adoption in these cases; especially is this true where a decided and rapid invasion of the myocardium has declared itself symptomatically, *e.g.*, in arrhythmia, in tachycardia, and in the event of the development of fresh murmurs. It should be pointed out that experience has shown neosalvarsan to be no less apt to induce serious collapse than salvarsan, and the former, in the writer's experience, is not less painful than the latter. Brooks and Carroll are of the opinion that the old salvarsan is more efficacious in the relief of heart complications in syphilis than neosalvarsan.

Unless a negative Wassermann reaction occurs when salvarsan is administered in the manner stated above, a follow-up course of mercury should be accorded a fair trial, and it may now give a permanent result. To show the degree of improvement gained from any method of treatment, the Wassermann test should be, as already stated, undertaken from time to time.

The iodides are indicated in the treatment of cardiac syphilis after the active process has been checked or has ceased, in order to effect absorption and replacement of tissue, and it is advisable to continue them so long as progressive improvement is manifest. For a period of one year after a negative Wassermann reaction has been obtained, mercury should also be exhibited, and this combined medication should not be neglected. The dose of the iodides, preferably of potassium, may be pushed to the limit of tolerance, if desired, but Anders has not seen any better results from this mode of administration than from a maximum dose of ten or fifteen grains gradually reached after commencing with a five-grain dose.

OBSERVATIONS IN PHYLACOGEN THERAPY BY A GENERAL PRACTITIONER.

The *Louisville Monthly Journal of Medicine and Surgery* for May, 1916, contains an article by GODFREY in which he states that his experience in the use of the phylacogens has extended over a period of three years. From the results he has had during this time it is his conviction that, when a diagnosis is properly made by aid of the modern laboratory and clinical methods, and the appropriate phylacogen used intravenously with good technique and in small doses frequently repeated, it is certainly the preparation *par excellence* in the treatment of infections, particularly of the rheumatic and of the metastatic gonorrheal types.

THE INTRAVENOUS ADMINISTRATION OF MERCURY IN SYPHILIS.

In the *Medical Record* of May 6, 1916, SHAW states that the use of the bichloride of mercury as an efficient form of antisyphilitic medication was suggested to him by Dr. Shropshire, who gave Shaw a reprint of an article by an Alabama physician. And as the availability of salvarsan was fast decreasing, and as such had always been too costly so far as certain classes of patients were concerned, especially the Mexican who applies at the free clinics, and for routine use in the municipal out-patient departments, they decided to begin the use of mercury salts intravenously; they entered upon this work at the City Hospital with the idea of determining a definite average dose and time of administration, in all of which work they have been ably assisted by Dr. Barrow, who has undertaken the active administration of the medicine.

They first used the bichloride of mercury in physiological salt solution in doses of 1/12 to 1/8 grain of the bichloride in 10 to 20 Cc. of the salt solution. They found, however, that unless this solution was prepared freshly immediately before the administration, the patient presented very alarming symptoms from one to six hours after receiving the medicine, such as chill, temperature 102° to 104° F., pain in the abdomen, bloody stools, retention of urine, albuminuria in some cases, nausea and vomiting, together with headache. This reaction was due to the breaking up of the bichloride into calomel and HCl, and not to contamination by live or dead bacteria or by bacterial products. All references consulted, however, insisted upon the use of sodium chloride in the intravenous solution to prevent the laking of the blood. Upon consulting his notes from the Oppenheim clinic in Vienna, Shaw found the following method used:

Bichloride of mercury, 0.20;
Sodium chloride, 0.30;
Distilled water, 100.00.

Give daily 1 Cc. intravenously.

The effects were quick. The patient got practically 1/30 grain bichloride per day. Shaw does not remember having seen any bad effects, local or constitutional.

He concludes that:

1. The intravenous usage of the bichloride of mercury is quick, safe, and certain; the dosage is mathematically exact and the administration is free from pain.

2. The immediate introduction of the curative agent into the circulating blood is what has not been obtained by the other methods of using mercury.

3. The phlebitis and the periphlebitis occur in proportion to the concentration of the solution used, and this danger can be minimized still further whenever the sensitiveness of the patient demands.

4. The effects are just as quick, in many cases surer and more permanent than those following neosalvarsan or the salvarsan, and the drug acts in cases in which these have given no appreciable results.

5. Bichloride intravenously is the poor man's remedy, and because of its cheapness, availability, and ease of administration, Shaw wonders why its use was ever discontinued after once it was thoroughly tried.

THE PROPHYLACTIC USE OF TETANUS ANTITOXIN.

In the *American Journal of the Medical Sciences* for May, 1916, ROBERTSON concludes an article as follows:

1. The most ideal and perfect protection against tetanus is the protection of active immunity produced before the infection has occurred. This admittedly is not yet practical, but deserves further consideration and research.

2. In the large majority of cases the subcutaneous injection of twenty units immediately after the injury will prevent with certainty the occurrence of tetanus. The delay of a few hours in making the injection may mean the loss of life.

3. Local applications of fluid antitoxin on the wound are efficacious, but unnecessarily wasteful and not always practical.

4. In cases in which injections cannot readily be made, especially in time of war, the immediate application to the wound of

dried antitoxin tampons moistened by clean fluid may be used as a temporary substitute until fluid antitoxin can be injected.

5. Powdered antitoxin on the wound is not, as a rule, dependable. Its one useful field is perhaps the prevention of tetanus neonatorum.

6. Certain failures are to be expected in the prophylactic treatment of tetanus as carried out at the present time. Occasionally cases of tetanus will develop in spite of the most careful precautions.

7. The protection afforded by antitoxin lasts from two to three weeks. Hence in cases of protracted suppuration, or where for other reasons secondary surgical interference is contemplated, either second injections of antitoxin should be made or dry antitoxin tampons freshly moistened should be placed on the wound.

8. Certain complications, most frequently urticaria-like eruptions, and very rarely more serious results, may follow injections of antitoxin.

THE INTRACRANIAL INJECTION OF SALVARSANIZED SERUM.

WARDNER in the *American Journal of Insanity* for April, 1916, writing of his experiences with this heroic method says of the fourteen cases, five improved sufficiently to be able to go back to their work, and to date have remained well for from seven to eleven months. At the end of eleven months one of these cases had a bad relapse. He was immediately brought back to the hospital, and (Wardner thinks this a point much in favor of the efficacy of the treatment) he responded immediately to additional applications of the serum. At present he is well, mentally and physically, and has parole of the grounds. Three other well-developed cases have improved sufficiently to be put upon parole of the grounds and are doing efficient work about the hospital. Three others have shown fairly marked physical and mental improvement, but cannot as yet be trusted at large. Two have died. In both of these cases autopsies were performed, and both showed, grossly and microscopically, changes suggestive of general paresis. The immediate cause of death was in one case bronchopneumonia, and in the other, which had right-sided convulsions at intervals, there was found a large cyst underlying the left motor cortex. This last case had previously shown a well-marked improvement and at the time of death was on parole. Two cases have shown no improvement.

Both mental and physical improvement has generally been observed after the second or third operation, and has followed so closely upon the treatment as to practically preclude the idea of coincidence. The maximum amount of improvement has occurred as a rule after six or seven treatments.

That the operation is not dangerous is shown by the fact that 102 have been performed without untoward results in any case. Thirty minutes suffices for the whole procedure, and the anesthetic has been well borne in all Wardner's cases.

The cases treated were not selected but were taken at random from the admissions of the past two years. Every attempt has been made to exclude psychoses other than general paresis, and in every case the clinical diagnoses have been supported by the laboratory findings.

Where pupilary disturbances existed no marked change has been noted after treatment. Reflexes, when previously exaggerated, show a tendency to become less so. Coördination and speech have been improved in all.

In the blood the Wassermann reaction has been rendered negative in six, reduced in intensity in four, unchanged in three, and not taken in one. In the spinal fluid the Wassermann has been rendered negative in two, reduced in six, not retaken in two, unchanged in the rest. The cell count has been reduced to below 10 per cm. in 12; not retaken in two. The Ross-Jones reaction for globulin has been made negative in one; unchanged in the remainder.

What the final outcome of these cases will be Wardner cannot, of course, state. His best results have occurred in those in

which the manifestation of the disease process had been noticed within a comparatively short time, and in which the actual destruction of brain tissue might reasonably be supposed to be slight. He believes that if cases of general paresis could be diagnosed early and thoroughly treated much might be done to control the future progress of the condition.

CITRATE TRANSFUSION FOR HEMORRHAGE.

In the *Journal of the Missouri State Medical Association* for May, 1916, HEMPELMANN points out that the various methods of transfusing human blood may be divided into four classes, namely: (1) those in which the vessel of the donor is connected directly by means of sutures or special cannulæ (Crile) with the veins of the donee; (2) those in which a hollow needle is introduced into the vein of the donor and another needle into the vein of the donee, and the blood aspirated into a syringe and expelled into the donee's vein by means of a two-way cock, or by disconnecting the syringe (method of Lindemann, Unger, *et al.*); (3) the methods by which the blood is drawn into paraffined glass tubes and then reinjected into the vein of the patient before it has time to clot (Kimpton, Brown, Curtis, *et al.*); and (4) those in which some anticoagulating medium, such as hirudin or sodium citrate, is added to the blood, which is then reinjected into the vessel of the patient. Hirudin is somewhat toxic, so that now the addition of sodium citrate is usually practiced. It seems to be harmless in the dilute solutions used for transfusing, namely, 0.2 to 1 per cent. The method was first worked out and described by Hustin of Brussels, who published his paper in May, 1914. During the spring of 1915 Richard Lewissohn and Richard Weil described the same method, both working independently and without knowledge of Hustin's work.

The syringe, cannula, and paraffined tube methods all require a certain amount of technical skill on the part of the operator, special instruments, skilled assistants, and can usually be carried successfully only in a well-equipped operating-room. The citrate method, on the other hand, is so simple that almost any physician can successfully carry out a transfusion without the use of special instruments or skilled assistants, and the proceedings may be done in less than one-half hour at the patient's home without moving him from his bed. It is because of these advantages over the older methods that Hempelmann has thought it worth while to bring the citrate method to our attention. There may be differences of opinion as to the best way of transfusing, but he believes there can be no question as to the many advantages the citrate method has for emergency work, and especially in the treatment of protracted hemorrhage. It has been found that after a certain amount of blood has been lost there is frequently an oozing which is at times uncontrollable, due to a change in the blood itself and the formation of thrombi which are soft and friable and not capable of occluding the vessels effectively. This occurs even in persons who are not bleeders in the usual sense. If, however, fresh blood is added by means of a transfusion, not only is some of the lost blood replaced, but prothrombin and platelets are added. Experience has shown that the thrombi, which form after a transmission, effectively block the vessels and the hemorrhage frequently ceases. Strange as it may seem, the addition of sodium citrate *in vitro* in no way interferes with this action on the clotting of the blood *in vivo*, either as to coagulation time or consistency of the clots.

The Lewissohn operation is performed in the following way: 5 Cc. of a 10-per-cent sterile sodium citrate solution are placed in a graduate, a rubber tube is then placed about the arm of the donor, a rather large needle is introduced into the vein of the donor, and the blood is allowed to flow in a stream into the citrate solution until 250 Cc. has been collected. This makes a 0.2-per-cent solution of citrate in blood. An assistant stirs the citrated blood with a glass rod while it is flowing into the receptacle.

Then another graduate is filled, and so on until one has collected as much blood as one wishes. The citrated blood is then poured into a salvarsan apparatus and injected into the patient's vein in the usual way, care being taken not to inject too fast in order not to cause dilatation of the heart. The citrated blood may also be placed on ice and kept several days (even as long as six days) before being injected, without any detrimental effects, even the oxygen-carrying capacity of the red corpuscles not being affected in any way by this delay. The only danger connected with transfusion is due to incompatibility of the blood of the donor and donee—that is, the blood of one being hemolytic or agglutinative for the other. Tests for hemolysis and agglutination should be made before every transfusion, except in desperate cases. These tests can be carried out in about one to two hours according to a special "rapid" technique. A Wassermann is also indicated, if time allows. Contrary to the usual opinion, hemolysis is quite as apt to occur in the blood of two blood relatives as in that of strangers.

THE CHOICE OF CLIMATE IN CASES OF BRIGHT'S DISEASE AND NEPHRITIS.

In the *Boston Medical and Surgical Journal* of May 4, 1916, HINSDALE states that Bright's disease and nephritis are diseases clearly amenable to climatic treatment. Apparently the first requisite is that the air and soil shall be warm, sunny, reasonably dry, and free from malaria and disagreeable atmospheric changes. It is a disease attended by extensive degenerative changes in the renal and circulatory organs, and hence it is highly necessary to insure an abundant and undisturbed action of the skin. The locality should be conducive to an out-of-door life the year round. This is the well-known advantage of the climate of Southern California, where the little rain that falls never does any one any harm.

The best course is to advise a warm climate first—one having moderate elevation and only a moderate rainfall, with small diurnal variations in temperature, the humidity being, perhaps, secondary in importance to temperature and wind.

The fact that other localities in the extreme northwest, such as the States of Washington and Montana, as well as Colorado, Minnesota, Wisconsin, Michigan, and Utah, have such diverse climate, and, nevertheless, fall in the favored group, should not determine their choice as health resorts for renal cases, but would indicate some advantage in the character of the population, and that the sum total of the elements of climate in those localities is conducive to a hardy race.

THE TREATMENT OF HEMORRHOIDS BY INJECTION.

In the *Lancet* of April 15, 1916, SWINFORD states that after reading a number of articles on this topic he determined to try this method amongst the out-patients at St. Mark's Hospital. After an experience there of a hundred cases he came to the conclusion that with proper precautions it was quite safe, and except in one or two cases absolutely free from pain. One injection sufficed to cure some, but the majority required two or three spread over some months. It failed in one or two cases owing to prolapse of the swollen piles on the patient's way home, followed by strangulation and sloughing. This was the result of neglect in obeying the instructions given—namely, to replace the piles at once should protrusion occur. These patients were afterward admitted and underwent the usual operation of ligature by Salmon's method.

The injection treatment proved satisfactory, even amongst the out-patients of a hospital. On account of the long way many had to go in returning to their homes and to a lack of intelligence in some, this is a severe test. Swinford adopted it in private, and has continued its practice ever since with satisfaction to his patients and without an accident of any kind.

Mr. Morley uses, Swinford says, the same injection he does and of the same strength—viz., 20 per cent of carbolic acid

in equal parts of glycerin and water. At first he worked with a ten-per-cent solution, but found on increasing the strength that recurrences were less frequent, nor was it attended wtih any pain. He is in thorough accord with all Mr. Morley says as to the cases amenable to this treatment, the precautions necessary for a successful issue, also as to the wonderful saving of time, expense, and sometimes of pain achieved by its adoption, but his technique somewhat varies from Morley's. It is as follows: The piles having been protruded, possibly with the aid of an enema, the patient is placed in the knee-elbow position with the buttocks opposite a good light. The parts are then sponged over with some antiseptic, as lysol and water, and the injection made through a sterilized needle. From three to six minims of the carbolic solution is injected into the center of each pile in turn. In large piles he often injects five minims in two places. The piles are then smeared with vaselin or sulphate of iron ointment, and returned as soon as possible, for the injection always causes the hemorrhoids to swell, therefore the longer they remain outside the more difficult are they to return. He advises no action of the bowel for forty-eight hours, and should prolapse occur in the meantime immediate replacement is essential.

Whilst Mr. Morley injects the piles *in situ* through an anal speculum, Swinford always gets them prolapsed first and injects them whilst still protruding, returning them immediately afterward. He is glad to hear that Morley injects all the piles at one sitting, for that is what he has always done. Several writers have advocated only injecting one pile at a sitting, but he cannot see any reason in this—an unnecessary loss of time it seems to him.

His reasons for having the piles extruded before injecting them are these: (1) It is much easier, and one is more certain of getting into the center of each pile. (2) If the piles are injected through a speculum a special long syringe, such as described by Mr. Morley, is necessary, whereas an ordinary hypodermic syringe suffices when the piles are prolapsed. (3) Piles which cannot be protruded should be left alone. They are to be cured by palliative means, such as local applications, enemata, attention to diet, and regulation of the bowels, etc. (4) An assistant is almost a necessity if a speculum is used, and should any bleeding occur on the withdrawal of the needle, is indispensable. Swinford does not suppose this is as likely to take place as when the piles are prolapsed, but it might occur, when an extra pair of hands would be useful.

A large number of cases of internal hemorrhoids can be cured by palliative treatment—by this he does not mean the use of nutgall ointment—but when protrusion occurs on exertion or at stool, when bleeding is sufficient to cause anemia and troubles arising therefrom, or when the piles protrude and require replacement, some operative interference is imperative. Before any operation is undertaken it is essential that a thorough examination should be made to avoid overlooking a rectal carcinoma or other trouble high up, an accident which even to-day is constantly happening in spite of repeated warnings from others as well as the writer. Cases fitted for injections are those of uncomplicated internal hemorrhoids which can be protruded, then returned and kept within the bowel. In hospital practice one finds really but few cases of uncomplicated piles, for most of those admitted for operation have in addition one or more of the following lesions, viz., external tags, fissure, hypertrophied papillæ, ulceration, and even fistula, or are of the interno-external variety. In a short paper on this subject, to show how comparatively few cases are fitted for the injection treatment, Swinford instanced an afternoon's work at St. Mark's Hospital, where he had 11 cases of piles to operate upon. Of these, 10 were complicated by other lesions, viz., 4 with fissure, 4 with external piles, 1 with an anal ulcer, and 1 with thrombosed internal pile. In private, however, the reverse is usually the case.

Swinford is in accord with Sir James

Goodhart and one or two other writers that this method of treatment deserves to be more generally employed than it is at present, but Goodhart seems to have arrived at this conclusion from a somewhat unfortunate experience of the immediate and after-results of operation, whether by the ligature or by Whitehead's method. His experience of the latter coincides with Swinford's. Theoretically it is splendid, but practically it is far inferior to either the ligature operation or to the clamp and cautery, so that Swinford never advises this method, and he is glad to see that it is rapidly falling into disrepute. But concerning the former, after an experience of over 6000 operations for hemorrhoids, he might say that he thinks there is no more successful operation in the whole range of surgery than is "Salmon's" ligature operation as practiced to-day. It is equally fitted to both simple and complicated cases, is devoid of risk, often but little pain is complained of, and convalescence is usually a matter of three weeks. If properly performed recurrence is so rare that it need not be taken into account. It is quite true that an anal stricture may result, but if this necessitates an operation it is generally owing to neglect or ignorance on the part of the medical attendant. If a finger is passed between the eighth and tenth day—*i.e.*, when the ligatures have separated—any suspicion of oncoming contraction is discovered and dilatation at once resorted to. In such cases at all events we can promise no further return of piles. Although Swinford has often had to dilate about a fortnight after the operation either with a bivalved speculum or with metal dilators, he has never had to resort to a cutting operation to cure this condition.

After the injection a few hours in bed are advisable, after which the patient can walk about and attend to his usual occupation. He has no pain and begins to get better at once. Often all bleeding and prolapse cease after the first injection, which may suffice for a cure. Latterly Swinford has not often had to repeat the injection, and when it is necessary a year has probably elapsed and all the symptoms are ameliorated.

The great advantages of the injection treatment are: (1) No confinement to bed except for a few hours when possible; (2) no anesthetic, and therefore no postanesthetic vomiting; (3) no pain; (4) no enforced absence from business; (5) no risk from the little operation itself and no risk of strictures or incontinence following; and (6) immediate and steadily increasing betterment.

As an advocate for this method, Swinford cannot put it stronger than by saying that if he were the subject of uncomplicated reducible internal hemorrhoids which called for operative interference he would select injection in preference to any of the recognized operations, always provided that it could be carried out by one who had had at least some experience of its simple technique.

THE TREATMENT OF ACUTE ANTERIOR POLIOMYELITIS IN THE PREPARALYTIC AND POST-PARALYTIC STAGES.

In the *New York Medical Journal* of July 22, 1916, NEUSTAEDTER points out that since the disease is directly contagious and is disseminated by healthy as well as sick carriers, prophylactic measures are essential. A strict quarantine for a number of weeks is, of course, the first requisite for the efficient protection of the public. Since he has shown that dust contains the virus in a viable condition, he advises a thorough scrubbing of the floors and frequent flushing of the streets and sidewalks. We must remember that people spit on the sidewalks and children play there. On general principles he advocates the extermination of insects as possible carriers. Milk and other articles of food, where practicable, should be boiled. Domesticated animals and household pets should receive frequent washings. Bathing in stagnant water in an infected neighborhood, the playing of children around sand heaps in parks and their congregation in playgrounds or places of amusement during an epidemic should be

prohibited. Since it was shown that the virus is readily destroyed by menthol and hydrogen peroxide, he strongly advises that the nasopharynx of the sick be frequently sprayed with a one-per-cent solution of peroxide of hydrogen, and that of the healthy children be sprayed with a solution of 0.5-per-cent menthol in liquid petrolatum. As a measure of individual prophylaxis, this has given Neustaedter good results in his practice. All these measures he advocated in the International Congress of Hygiene in Washington, D. C., in 1912. Since then it has been shown that feces contain the virus, and it would be necessary to disinfect these discharges, as well as bedpans and urinals. Bedclothes and other linen used by the patient should be thoroughly boiled.

During the febrile stage, complete mental and physical rest is imperative, and should be continued so long as there is pain, for every movement causes discomfort. The patient, therefore, should be handled with extreme gentleness; we should avoid flexing the neck or hips, or extending the limbs, or even bending the spine. Neustaedter would even forego sponging in high fever, in order not to cause pain by such manipulation. Bromides and chloral are, as a rule, efficient in alleviating pain in infants, but in older children the opiates or coal-tar preparations will have to be resorted to in extreme cases. An exclusively fluid diet and mild catharsis, when necessary, should be carefully maintained. A cold compress to the head in temperatures higher than 102° F. proves soothing.

When the acute stage passes and paralysis sets in, a more active treatment must be instituted in order to prevent possible deformities and restore such muscular function as conditions may warrant. Neustaedter's guide as to when such active treatment should be begun is when pain subsides completely, and not earlier. So long as pain lasts, even with the fever gone, he immobilizes the affected limb by putting it in a well-padded splint, and patients are invariably grateful. He has seen many partial recoveries from loss of muscular function from such procedure. During the stage of active exudate manipulation of the extremity will cause fatigue in the nerve cells, and is apt to enhance the progress of degeneration, while complete rest may, and frequently does, hasten absorption of the exudate, and restitution ad integrum of nerve and muscle is made possible. All our spontaneous recoveries are due, in a great measure, to such precautions. Warm baths during the afebrile stage are of great benefit, and the patient should be left in the bath as long as he can remain with comfort—the longer the better. With the pain gone, about a fortnight after the onset of the paralysis, we may begin with massage, passive movements, and galvanism. No more than five minutes should be allotted to these measures daily, for the structures need very little encouragement, and too much stimulation will easily exhaust them and produce the reverse of the desired effect. In using galvanism Neustaedter prefers the interrupted to the continuous current, and then only of a weak amperage, just enough to produce contractions.

Active exercise of the muscles by the patient should be encouraged, and this is best accomplished with infants while bathing daily by putting into the tub some floating toys and encouraging the patient to attempt to handle the objects with the affected limb. Older children can be persuaded to counteract antagonistic passive movements by the masseur. It may well be remembered that at times groups of cells in a given involved segment of the cord or cranial nerve nucleus may escape destruction and their function be restored, if thus encouraged. In this treatment we should persist for years. Several youngsters in Neustaedter's private and clinical practice who were hopelessly paralyzed for months, after persistent treatment for several years, have regained a fair amount of function in certain muscle groups. To avoid contractures, counteracting splints may be applied with advantage, but left on only part of the time at the beginning—for example, only over daytime, and removed at night. If no improvement is noticeable

in any muscle group after persistent treatment for a few years, it is advisable to resort to operative measures, such as tendon transplantations or other surgical measures, as the case may demand. That the patient should at all times have a bland, well-nourishing diet and plenty of fresh air applies here as well as in all febrile and wasting diseases. In common with all clinicians Neustaedter recommends that we should do all we can, and at the right time, but in our zeal take care not to overdo.

THE TREATMENT OF INFANTILE PARALYSIS BY ADRENALIN.

MELTZER in the *Medical Record* of July 22, 1916, writes as follows:

The first requirement of a new treatment is that it should do no harm. On the basis of his extensive experience he was, and is, sure that a cautious intraspinal injection of adrenalin does no harm. As to the good it may do, he has given in his brief statement full reasons for the justification of his expectations. Will adrenalin accomplish a real cure? Any one who is trained in experimental and clinical criticism can readily see that this question cannot be answered for some time to come. On the other hand, it is quite certain that in many cases it will be of no value on account of the frequent occurrence of a steady ascending progress of the chief inflammatory focus to the origin of the phrenic nerves and to the respiratory and the vasomotor centers. The failure of adrenalin to help in some cases does therefore in no way speak against its possible usefulness in some other cases. On the other hand, the recovery of some cases does not speak definitely for the usefulness of adrenalin, since 75 per cent of the patients recover without this treatment.

This criticism is applicable to any kind of useful remedy in a disease in which the mortality is comparatively low. However, there is one form of evidence which is of actual value, and that is when an improvement is observed which has to be ascribed to the remedy. That kind of evidence he has unmistakably seen in the experimental poliomyelitis of monkeys, and Meltzer may say now that similar evidence has already been obtained in the treatment of human beings. One competent physician wrote to Meltzer July 12th the following: "So far have made observations on three cases, on the effect of intraspinal injection of adrenalin. In one case in particular the results certainly were good and resembled those obtained by Clark experimentally." Dr. J. C. Regan, resident physician of the Kingston Avenue Hospital, stated to Meltzer expressly that he is sure that the intraspinal injection of adrenalin and the administration of oxygen under pressure exert a good effect. In one case, complicated with pneumonia, recovery took place under this treatment. The immediate effect of the oxygen administration upon the cyanosis was unmistakable, and he wished Meltzer to let them keep both apparatus for the administration of oxygen for some time until they could obtain their own. Under these circumstances Meltzer is of the opinion that the treatment of poliomyelitis by the measures he suggested is not only permissible, but it would be nearly bordering on criminal neglect not to use them. This last statement is perhaps exaggerated, but at any rate it was his perfect right and duty to bring forward his therapeutic suggestions.

WHAT THERAPY MEANS.

Writing in the *American Journal of the Medical Sciences* for July, 1916, OSBORNE gives these lines of advice:

1. Not to forget to use every means to prevent the spread of the contagion and the infection of others if the disease is contagious. If the disease is not contagious, the general hygiene and care of the secretions of the nose and mouth and of the excreta are always of more or less importance.

2. If the cause of a disease can be removed or actively combated, that is the part of the treatment that takes precedence of all others.

3. If the disease, or its localization, or its lesion, or a simple condition, as a cold or a headache, can be aborted, that is another primary object of treatment. The direct

treatment of the cause (antitoxin, etc.) may do this, or local measures, as ice, heat, hyperemia, leeches, purges, simple surgical measures, etc., or various drugs may so act as to prevent, control or abort an impending lesion or functional disturbance.

4. A lesion having occurred the patient will not be well until it has disappeared, resolved, or been removed, and hence as soon as a lesion has been established it is the aim of all our science to eradicate it. Time and nature's own antagonistic and recuperative powers may unaided accomplish this object, but very frequently we can aid and hasten nature's processes by various means. Frequently only surgery can remove a lesion. At other times a lesion becomes permanent and the patient is permanently damaged to that extent. He may be apparently well in spite of this defect, or he may be well as long as he so modifies his food, life, and activities; or he may be an invalid; or the lesion may be the cause of his death, sooner or later. However, in any of these eventualities the management of the lesion and its pathological results is the main object of treatment.

5. Whether or not the lesion can be successfully treated, objectionable or disturbing symptoms must be stopped or ameliorated. No one but the consultant and textbooks can refuse to treat symptoms; the practicing physician must and should treat symptoms. The banal phrase of "symptomatic treatment," pointed at with finger of scorn, must be now recognized as of great importance under the new name of the "necessary treatment of symptoms." Pain cannot and must not be suffered, lest cardiac depression and exhaustion occur. High, prolonged fever must be reduced, not every little temperature. Too high blood-pressure must be combated, and circulatory failure must be guarded against and combated when present. Almost all acute diseases will cease and the patient will recover, provided his heart can be sustained. It is the heart age. The heart fails and the patient dies even before we have got well into our fight against the disease. We have come from the bleeding, vomiting, purging, starving age, through the aconite and alcohol ages, to the feeding and strychnine age —all showing the change of heart both in ourselves and in our patients. Now too much strychnine is given.

6. Students are not sufficiently taught, and the practitioner does not often enough consider the disturbances of function due to, or caused by, the disease that is present. Medical students are so engrossed in the pathology, differential diagnosis, prognosis, and specific treatment, if there is any, as to get the whole idea of the subject under the caption of "the patient who has the disease." Hence the patient himself and his disturbed physiology or disturbed functions are forgotten, to his detriment. Just what functions may be disturbed, of course, depends on the disease, the lesion, and the prominent symptoms, but it is an axiom that disturbances will occur, and they should be corrected if possible.

The life processes must go on in illness as they do in health, nutrition must be kept up, excretion must occur, repair by sleep must take place, and the organs concerned in these life processes must be coaxed into the greatest efficiency possible with the handicap that they are enduring.

7. The diet must of necessity be modified by the intensity of the illness, and the condition of the organs of digestion. The food and drink must always be carefully considered, regulated from day to day to meet the conditions, and then gradually increased during convalescence, or perhaps be modified by a lesion that is permanent.

8. Of course, we wish to hasten convalescence, but have we always carefully enough studied our partially healed patients to scientifically decide just what rapidity in the complete recovery we should expect? Generally we have not done so.

A too low systolic blood-pressure, below 105 mm. in an adult, should prohibit his sitting up and certainly his attempting to walk. Too many long, tedious heart weaknesses from strain occur after operations and after severe illness because patients are allowed to get up too soon. The appendix patient up and out in ten days is a cardiac

and abdominal risk that should not be advocated.

Again, all physical means of massage, graded exercise, fresh air, change of scene and of climate, or location at least, should be considered in hastening recovery and making that recovery complete.

MEANS OF PREVENTION OF INFANTILE PARALYSIS.

In the *New York Medical Journal* of July 22, 1916, FLEXNER says there is at present no safe method of preventive inoculation or vaccination and no practicable method of specific treatment. The prevention of the disease must be accomplished through general sanitary means; recovery from the disease is a spontaneous process which can be greatly assisted by proper medical and surgical care.

THE TREATMENT OF PARESIS.

In the *American Journal of Insanity* for April, 1916, EVANS and THORNE in discussing the use of salvarsanized serum state that the great imperfection of this method seems to lie in the small quantity of salvarsan given and in the long intervals that must elapse between its administrations. A large dose of salvarsan is too irritating and cannot be borne by the patient, and if the treatments are given at shorter intervals one is simply withdrawing a part of the serum last injected, because it takes nearly two weeks for the serum to be absorbed from the spinal arachnoid space.

The spirochætes that survive the first dose have an opportunity to multiply and continue their work of destruction before the next treatment can be given.

A patient with a very small lesion in the brain at the beginning of a series of treatments will have a much larger one before the invading organisms are finally killed off.

The largest number of intraspinous treatments given to one individual was ten, and the smallest number three.

Three of these patients showed mental and physical improvement; five showed physical improvement only; two died during the course of treatment; two died ten and thirteen months, respectively, after treatments were discontinued; the remainder showed no improvement whatever.

Of the three who showed mental and physical improvement, one was discharged and still remains in good physical and mental condition, having "returned to work and received a substantial raise in salary," over fourteen months having elapsed since last treatment. One showed first signs of improvement three months after receiving last treatment. He was taken home by his friends, and Evans and Thorne have lost track of him. The third died with convulsions ten months after treatment.

The number of treatments which they have given to each patient was insufficient to reduce the intensity of the Wassermann reaction either with the blood or the cerebrospinal fluid. The negative reactions they have obtained may be seen in almost any case of untreated paresis.

The number of cells in the cerebrospinal fluid change with each lumbar puncture independent of any medicinal agent. It is generally reduced to a greater or less extent, but in some instances it may be increased and the changes in the number of cells, following intraspinous treatments, are the same as those following lumbar puncture without treatment.

The improvements which the authors have observed following their treatments may be seen among the same number of paretics who have received no special treatment.

The number of treatments they have given are insufficient to control the course of the disease in patients who are as far advanced as they usually are when admitted to institutions for the insane.

They believe that the amount of salvarsan which can be introduced safely into the central nervous system is too small, and the intervals are too long between the treatments, to be of any great value in moderately advanced cases.

The intracranial method seems to be unnecessary. The same results can be obtained with the intraspinous method.

THE TREATMENT OF THE ACUTE STAGE OF ANTERIOR POLIOMYELITIS.

Bass in the *Archives of Pediatrics* for August, 1916, states that the chief object to be attained in the earliest stage of the disease is to keep the patient absolutely at rest. The child should be disturbed as little as possible, in order that the inflamed portions of the nervous system may be kept quiet. Picking up the patient or moving him about must be strictly avoided, not only because the spine should be kept at rest, but on account of the pain caused by even the slightest motion. The most noticeable feature of the disease outside of the paralysis is the extreme hyperesthesia. This applies not only to the affected extremity, but also to the entire spinal region, in particular to the neck. Bass has seen a number of children who could not lie on their backs on account of pain when they rested on the spine. In such cases there is a marked arching of the spine, as if the child were afraid to allow the back to rest on the bed.

To insure complete rest Machol, of Munich, has recommended putting the affected limbs in plaster casts as soon as the paralysis has become evident, and leaving these in place until the acute stage of the disease has passed; also immobilizing the spine by a plaster-of-Paris jacket. Occasionally considerable relief follows this procedure.

Further relief of the pain and hyperesthesia may be accomplished by means of drugs—bromides, codeine, and morphine in appropriate dosage. Aspirin is also useful as an analgesic in doses of 2 to 3 grains t.i.d. for a two-year-old child. Local application of heat in the form of a hot-water bag should be tried. Warm baths have been highly recommended for their sedative effect, but they would appear to do more harm than good, since they necessitate too much disturbance of the patient.

The bowels should be treated as in any acute infectious disease, and retention of the urine, which occasionally occurs, must be remedied.

The appetite does not seem to suffer in proportion to the seriousness of the illness, for even in the severest forms of the disease the children partake readily of food. During the febrile stage fluids and semisolids should be given, but as soon as this stage is past the child may have solid food. In the cases in which the muscles of deglutition are involved and in the severely toxic cerebral forms gavage may be necessary, though this is exceptional, and then only needed for short periods of time. In the last mentioned type, in which emaciation is often rapid, the use of normal saline solution by rectum is highly beneficial.

Where the respiratory center is involved, life may be prolonged by the use of insufflation apparatus, artificial respiration, or by galvanization of the phrenic nerve; but though Bass has kept patients alive for hours by these means, he has not seen any cases thus treated recover.

Even early in the disease it is of the utmost importance to guard against increasing the deformity of the paralyzed parts by allowing them to remain in improper attitudes. Drop-foot is especially to be guarded against owing to the tendency to be pressed down by the bedclothes. A frame or cradle of some sort should be employed to keep the covers from touching the foot, and the nurse should be warned against tucking in the bedclothes tight. The foot of a paralyzed extremity should be held at a right angle to the leg by means of a sand-bag placed against the sole, or by a strip of adhesive plaster about the ball of the foot running up on the leg. Such a simple contrivance may avoid a tenotomy later on. Fingers begin to show contractures within the first weeks of the disease, and should be straightened gently and kept partly extended by some simple device.

Hexamethylenamine is generally recommended on account of its action as a germicide in the spinal canal. It should be used in relatively large doses and only during the first week of the illness. During its administration the urine must be carefully watched for signs of renal irritation. Its use is somewhat empirical, but in monkeys

it has been shown to be of value in some cases when administered early in the disease.

The seat of the disease being in the cerebrospinal nervous system, it would appear rational to administer remedies directly into the spinal canal. This has been done by Netter, who has reported 32 cases treated by means of intraspinal injections of serum from persons who have already passed through the disease. He performed lumbar puncture and withdrew as much fluid as came away, and then injected a slightly less amount of the serum. He used serum of patients who had poliomyelitis from twelve days to eleven years before. The serum was apparently most potent when collected from persons who had suffered from paralysis three months to four years previously. A Wassermann reaction was done on each of the donors to rule out syphilis. The blood was collected in sterile flasks and was then sterilized by repeated heating. Netter injected 5 to 13 Cc. (depending on how much cerebrospinal fluid was withdrawn) daily for eight days. He describes several cases in which an apparently rapidly spreading paralysis was stopped at once by the treatment.

Quite recently the intraspinal injection of a solution of adrenalin has been advised by Meltzer.

Lumbar puncture alone has been advocated especially by Roemer as a therapeutic procedure. It would seem indicated in cases in which there are signs of increased cerebrospinal pressure, but even in such cases Bass has not seen any especially favorable results following its use.

When all signs of acute inflammation have disappeared, gentle massage and passive motion of the affected parts should be begun. According to Peabody, Draper, and Dochez, the best guide for this is the disappearance of the pain and tenderness. Electricity may then also be employed.

Rest in bed should be insisted upon for several weeks after all apparent acute symptoms have subsided, and isolation should be continued for six weeks.

In all cases in which paralysis of the larger muscles remains, expert orthopedic advice is indispensable and should be secured early.

ADRENALIN IN POLIOMYELITIS.

MELTZER writes in the *Archives of Pediatrics* for August, 1916, that it is highly probable that in many instances of infantile paralysis the respiratory paralysis is not produced by the chief inflammatory focus, but by the extensive peripheral zones of exudation and edema, which are surely capable of interfering with the vitality of the nerve centers controlling the respiratory mechanism. If the exudation and edema could be removed for some time, the life of a few or of many of the cases might be saved, namely, if in these cases it just happens that the ascending progress of the actual inflammation comes to a standstill. On the basis of these facts and considerations he recommends the injection of adrenalin intraspinally in every case of infantile paralysis, the injections to be repeated from four to six hours. The procedure may save life, and in surviving cases it may reduce the extent of the final lesion. There is no danger to this procedure. Monkeys stand well as large a dose as 2 Cc. in a single injection. However, in human infantile paralysis the injections should be begun with a dose of 0.5 Cc. of adrenalin, until more is learned about the effects.

There are two other suggestions Meltzer wishes to make. One is to administer artificial respiration by means of the apparatus for pharyngeal insufflation as soon as the patient shows a degree of unconsciousness and respiratory insufficiency. It is an easy and reliable procedure. The second suggestion is to administer oxygen under pressure in a respiratory rhythm by an apparatus which he has recently devised and used on human beings in several instances. It abolishes rapidly cyanosis and may save life. It may even act specifically on the virus of poliomyelitis.

THE VALUE OF AUTOSERUM INJECTIONS IN SKIN DISEASES.

In the *New York Medical Journal* of June 24, 1916, GOTTHEIL reports his investigations and reaches his conclusions, which are as follows:

1. In psoriasis the autoserum treatment, while not in itself curative, is an important factor in the treatment. It cuts down the time required for the troublesome local treatment from weeks to days, and enables us to promise to clear the skin in from two to five days in even the worst and most obstinate cases. It postpones relapses for a long time, possibly indefinitely. In most cases it so influences the type of the disease that the relapsing lesions are few and insignificant, and are readily amenable to mild local treatment.

2. In chronic urticaria, neurodermatitis, pruritus senilis, and other obstinate itchy dermatoses, it is worthy of trial. In some cases its action is effective and brilliant.

3. It is of some value in bad pustular acne; but in furunculosis, folliculitis, and other pus infections Gottheil has not found it useful.

4. In chronic eczema the same may be said as of acne; the injections are sometimes apparently effective, and at others fail entirely.

5. In pemphigus, lepra, and obstinate lichen planus it is ineffective.

6. In syphilis it is useless.

THE ACTION OF GAMMA RAYS ON DEEP-SEATED INOPERABLE CANCERS OF THE PELVIS.

In the *Official Bulletin of the Chicago Medical Society* of June 24, 1916, SCHMIDT gives this summary:

1. The therapeutic action of radium depends on the use of a correct technique, which must be based on a careful physical examination of the patient and the physical properties and the biologic action of the metal.

2. The use of massive Roentgen rays, according to multiple field and cross-fire methods, in conjunction with radium therapy, to destroy metastases, is an imperative necessity.

3. Certain surgical procedures must be used in radium therapy to assist the action and facilitate the application of the rays.

4. The action of *x*-ray on cancer tissue is specific and suggests positive proof of the possibility of destroying malignant tumors by the application of radium.

5. The results of radium therapy in inoperable and recurrent cancers surpass those of any other known therapeutic agent.

6. The prophylactic use of radium rays in operable carcinomata increases the percentage of operability and probably the efficacy of the operative procedures.

SOME OBSERVATIONS ON THE EFFECT OF EMETINE ADMINISTRATION ON THE FREE VEGETATIVE FORMS AND CYSTS OF ENTAMEBA HISTOLYTICA AND ENTAMEBA COLI.

In the *Journal of the Royal Army Medical Corps* for June, 1916, J. G. THOMSON and D. THOMSON report their studies on this subject. They conclude as follows:

1. If an amebic case receives a continuous course of treatment with emetine of not less than a total of seven to ten grains of the drug administered in grain doses daily for a week, it is probable that he will never become a carrier of cysts. In order, however, to make certain of this, it is better to carry the treatment further. Such treatment also prevents relapses.

2. Cysts of E. histolytica can be cleared out of a patient after six grains of emetine, but to make absolutely certain of this it is better to exceed this dose. This treatment must be combined with saline purgatives, so as to get free daily action of the bowels.

3. A case of amebic dysentery inefficiently treated with less than seven grains of emetine is likely to become highly dangerous as a carrier of cysts. One or two small doses may act beneficially and get rid of active symptoms, such as the passage of blood and mucus, but it may at the same time stimulate the formation of cysts. The cessation of treatment on the disappearance of active symptoms is fraught with danger,

both to the patient and, subsequently, to others.

4. All patients known to have blood and mucus in their stools and to have received less than an efficient total quantity of emetine ought to be examined for the presence of cysts in the feces, as it is highly probable they have thereby become dangerous carriers.

5. The transmission of dysentery is undoubtedly due to the ingestion of cysts. This is brought about by the contamination of food by the fingers, or by flies. Cysts may also be carried along with sand particles by the wind.

6. The powers of resistance of cysts outside the body are considerable, and this should be borne in mind by all responsible for sanitary prophylactic measures against dysentery.

REMOVING THE TONSILS.

I. W. and Y. W. FAISON in the *Charlotte Medical Journal* for June, 1916, state they feel they must say something to men who are removing tonsils. First, don't remove a tonsil unless it is diseased. If you do remove it, take time and do it as a regular surgical operation. Do not by carelessness and hurry cut the pillars or any of the anatomical tissue about it. Dissect out the capsule in its entirety, so no stump can be left as a focus for evil conditions. Do not be weak enough or ignorant enough, if your patient comes back in two or three years for removal of the same tonsils, to say that they have grown back. If you will take time and dissect out completely the tonsil and capsule, the tonsils cannot grow back.

THE COCKROACH: ITS DESTRUCTION AND DISPERSAL.

HOLT in the *Lancet* of June 3, 1916, reports a long series of experiments on this subject:

Summarizing the results of the experiments as a whole, they seem to indicate that many of the substances which have been supposed to kill the cockroach have really acted by driving it away and so leading to its disappearance. Such gregarious migrations have been observed, but have hitherto been otherwise explained. For quick destruction stoving with bromine or sulphur dioxide is apparently best. For domestic application the daily use of creosote, wood naphtha, or the oil of rosemary, eucalyptus, or citronella placed near the haunts of the cockroaches for two or three weeks, should effectually disperse them. Where these are inadmissible on account of their smell, odorless dusting powders may be used. Of these sodium fluoride was found to be the most effective. It is also cheap and keeps indefinitely.

These experiments may have some value as applied to insect pests. The cockroach being abundant and of large size, it has been possible to use it as an "indicator" and to observe the results more accurately than would be possible with small insects. Other things being equal, the same results should follow in the case of many other insect pests.

THE USE OF THE "KARELL CURE" IN THE TREATMENT OF CARDIAC, RENAL, AND HEPATIC DROPSIES.

GOODMAN in the *Archives of Internal Medicine* of June 15, 1916, reminds us that the technique of the Karell cure is simple and easily carried out as far as the physician is concerned. The patient receives daily at 8 A.M., 12 M., 4 P.M., and 8 P.M. 200 Cc. of boiled milk, warm or cold, according to taste. No other food or liquid should be given. This strict diet sometimes, nay, many times, meets with violent opposition from the patient, and great complaint is made because of thirst. Thirst is particularly tormenting during the first three or four days of the "cure," and often it becomes necessary to allow the patient to rinse out his mouth with water, instructing him to swallow none, however. Hunger is not so common a complaint, but when urgent a small piece of dry toast or zwieback may be given with each portion of milk. During the first few days the patient requires continual encouragement to persist with the treatment, but the moral effect of

the rapid loss of weight, as shown by daily weighings, together with the very evident decrease of the edema, proves sufficient argument to him, and no further complaint is heard. Just how long this very strict diet is to be continued depends on the rapidity with which edema diminishes and on the patient's plea for more food. Usually the diet may be increased at the end of a week's time by giving a soft-boiled egg, without salt or pepper, at 10 A.M., and a piece of zwieback at 6 P.M. The next day an egg may be given at 10 A.M. and at 2 P.M., with a piece of white bread, and from now on food is gradually increased until a full diet is being taken. During this time the daily quantum of liquid should not exceed 800 Cc., and this fluid should be in the form of milk, until the patient receives a full diet, when the milk may be discontinued and cocoa or tea substituted, the amount of liquid remaining the same, however. No more than 800 Cc. of fluid should be taken from two to four weeks after the disappearance of edema.

The "full diet" spoken of above is a misnomer, for the diet should be salt poor, and the following foods comprise this dietary: meat, fresh-water fish, cream soups, fresh eggs cooked in any form or raw, rice, corn, hominy, Indian corn, endives, peas, string beans, French beans, artichokes, onions, leeks, carrots, salads except lettuce, cauliflower, potatoes, cereals of all kinds, butter unsalted, bread without salt, sweetmeats, sugar, chocolates, cocoa, tea, coffee, fruits, milk, cream cheese and Swiss cheese, puddings, junket, ice cream.

During the "cure," which it seems needless to say must be carried out with the patient in bed, the bowels must be kept open, and for this purpose laxatives in pill form are preferable to salines, merely because they require no water for their administration. In a typical case—that is, in those individuals who begin to lose weight through the loss of edema, and who show increased diuresis—no other medication is required, but where improvement is not seen at the end of three days, or when symptoms are urgent, such as dyspnea, oppression, restlessness, unduly frequent and weak pulse, or active uremic signs, the drugs and other measures usually indicated in such conditions should be used.

During Goodman's experience with the Karell cure there have been no bad results when the treatment has been properly used. There are cases, however, which do not seem to respond to the diet, and for this reason the Karell treatment is no longer recommended in these instances. Patients exhibiting symptoms of uremia should not be put on the Karell cure, which restricts the fluid intake to a minimum, as it has been shown by Senator and others that in this crisis the fluid intake should be greatly augmented for the purpose of flooding from the system the unknown toxic substance or substances believed to be the causative factor in uremia. Wittich states that the Karell cure in two cases of uremia left him absolutely in the lurch, and the patients were made materially worse. The treatment of such individuals should be that well known to all practitioners of medicine, and the Karell cure has no place whatever in the management of such cases.

OBSERVATIONS ON THE TREATMENT OF ANAPHYLAXIS.

In the *Lancet* of June 10, 1916, LEYTON claims that the treatment of anaphylaxis, at least in the guinea-pig, is not entirely hopeless, if due preparation is made. Rosenau and Anderson state (and Leyton's experience coincides with theirs) that untreated guinea-pigs never recover if the anaphylactic condition has proceeded to the convulsive stage. It is therefore noteworthy that the injection of alcohol or of spirit of camphor has in some cases averted death even after convulsions have begun. In four out of eight animals recovery took place after marked symptoms of anaphylaxis had set in, while among untreated animals showing only slight symptoms only 11 out of 43 recovered. The subcutaneous administration of alcohol in human cases of sudden collapse after the injection of serum is therefore worthy of trial. Leyton has attempted also to deal prophylactically wtih the individual symptoms exhibited by the anaphy-

lactic guinea-pig. In this animal both heart and lungs appear to be involved. The injection of camphorated oil just before the toxic dose of serum generally inhibits the respiratory signs; there is no cough, and after death the lungs are not unduly distended and do not show any petechiæ. But camphor will not avert the fatal issue, although it thus counteracts the respiratory signs, so that presumably respiratory failure is not the determining cause of death.

The effect of anesthesia on anaphylaxis is a matter of dispute. Besredka has said that it inhibits the phenomenon, while Rosenau and Anderson assert that it does not. In this case it would almost seem as if the negative must outweigh the positive observation. Leighton has not investigated the point himself, but as a nervous element is almost certainly involved in anaphylaxis, he has tried certain drugs, alone and in combination, acting both centrally and peripherally on the nervous system. By administering one or more of them before the serum, he has successfully averted anaphylaxis in a large percentage of instances. The drugs which he has used successfully are hyoscine, scopolamine, morphine, and atropine. Before recording the results he wishes to point out a possible source of confusion and disappointment. Although the alkaloid is said to exist in four isomeric forms, the British Pharmacopœia does not distinguish between them and uses the names hyoscine and scopolamine (levorotatory) as synonyms. Accordingly at least one well-known firm (A) calls its levorotatory alkaloid "hyoscine" and does not use the term "scopolamine" at all, while another firm (B) supplies two different substances under the two names. Leyton obtained preparations labeled "scopolamine" (levorotatory) and "hyoscine" (racemic) respectively, and discovered a marked difference of action between them. Put shortly, it may be said that only hyoscine B was of use by itself in invariably averting anaphylaxis: scopolamine B mostly did so, but hyoscine A, which is presumably identical with it, was of no use alone.

The doses given were, per 500 gm. of guinea-pig, of hyoscine or scopolamine hydrobromide, 1/400 grain; of morphine sulphate, 1/24 grain; and of atropine sulphate, 1/600 grain. The results are given in tabular form.

These results show that, in combination, both hyoscine (B) and scopolamine (A) have a distinct influence in preventing anaphylactic shock, but only hyoscine will do so by itself. This Leyton attributes to the more central action of hyoscine as compared with the more peripheral action of scopolamine. It is therefore the preferable drug to use, but apart from other reasons, owing to the uncertainty of obtaining it and not an isomer, it is well always to order the combination with morphine and atropine. Morphine and atropine by themselves do not possess any noteworthy protective power, but appear to counteract the dangerous properties of hyoscine.

Drugs.	No. of tests.	No. of survivals.	No. of deaths.
Hyoscine (B)	10	10	0
Hyoscine (B) + Morphine + Atropine	4	4	0
Scopolamine (B)	6	5	1
Scopolamine (B) + Morphine + Atropine	7	4	3
"Hyoscine" (A)	3	2	1
"Hyoscine" (A) + Atropine + Morphine	33	32	4
Hyoscine (D)	10	8	2
Hyoscine (E)	15	15	0
Total	91	80	11
Controls	63	24	39

Judging from the medical war literature so far published, anaphylaxis does not seem to have occurred so often as to have called for comment. Nevertheless, Leyton would recommend strongly the employment of hyoscine previous to the injection of serum for a second time in any case in which the interval since the previous injection has exceeded one week. Inasmuch as the soporific effect of hyoscine in the case of guinea-pigs is but little marked as compared with man, we may hope that it will be even more efficacious in human beings than in animals.

SOME CONDITIONS IN WHICH VACCINE THERAPY MAY REASONABLY BE EMPLOYED.

GREELY in the *Long Island Medical Journal* for June, 1916, points out that in vaccine therapy one principle stands out very prominently, in fact it is the leading one, in view of that basic principle of practice requiring one to be at least sure he is doing no harm.

This is it:

If there is reason to believe that all the susceptible cells of the patient are being stimulated by substances arising from the infecting agents, do not give a vaccine, for there is hardly a chance but that it will tend to swamp, by overstimulation, the normal reaction of the cells upon whose response cure depends.

The reason that greater harm is often done by indiscriminate vaccine therapy is the common use of stock vaccines in minute doses, and the fact that most patients can stand much more bad treatment than we think.

When is there reason to believe that all of a patient's susceptible cells are being stimulated to produce antibacterial substances? When the general constitutional symptoms of infectious disease are present: fever, rapid pulse, prostration, etc. Well-developed lung tuberculosis is an excellent condition in which to study the possible ill effects of injudicious vaccine medication. With it a patient is often so nicely balanced between improvement and decline as to respond most noticeably to beneficial or injurious influences; and the same is true of his lungs.

After a dose of tuberculin, what occurs in a tuberculous lung probably varies as follows:

If the disease process is early and the bacilli not accompanied by an accumulation of tubercular materials, the reaction in no wise differs from that which would occur in like circumstances with any other infection. Accordingly the increase in the digestive power of the blood over the bacilli causes the disintegration of some or all, and this digestive process is either so complete as to leave no irritating products to harm the neighboring tissue cells, or else such products are not formed in sufficient amounts to do serious harm.

However, when the tubercular process is more advanced and its products are accumulated in greater amount, any sudden increase in the specific digestive power of the blood looses such an amount of disintegration products that the tissue cells in the immediate neighborhood are swamped and many are digested by the tubercular products, just as tubercle bacilli may be by the blood serum. Thus it is that tuberculin often produces breaking down of tuberculous lung tissue, and is therefore usually indicated in advanced disease, certainly in all cases, early or late, of the disease while showing fever.

Surgical tuberculosis, after any existing abscess has been drained, is, however, most suitable for the treatment and very striking results have been obtained by its use.

[Tuberculin is not a very apt choice to illustrate the effects of vaccines.—ED.]

It seems strange that vaccine treatment of gonorrhea is not more frequent. Even during the acute stage, if there be no constitutional symptoms, as fever, it is possible that great good might be accomplished. However, when the acute manifestations of the disease have subsided there can be no question but that the total eradication of the organisms can be best accomplished through the use of vaccine. [This opinion is open to question.—ED.] An autogenous vaccine may be easily made by taking a plant during the acute stage, when organisms are plentiful, and to be obtained in pure culture with little difficulty. If distinct varieties (or strains) of gonococci exist, as is claimed, it may be of great importance to have the vaccine autogenous.

The suitability of gonorrhea for vaccine therapy is also indicated by the usual lateness in the disease of the appearance of the blood reaction sufficient to give a positive complement fixation test.

In a case suspected to be one of chronic gonorrhea, the use of a vaccine could give great assistance in the diagnosis, as in a

positive case a focal reaction, increased discharge, etc., would certainly follow the first one or two injections. Of course, a local (at the point of injection) and even a constitutional reaction might accompany it.

These principles furnish such strong contraindications to the employment of vaccines in the treatment of pneumonia and of typhoid that something more than the mortality tables and personal impressions quoted by some who have tried them is required to justify their use. The same is true of all infectious processes with continued constitutional symptoms, especially fever.

An ideal condition for vaccine treatment is presented by chronic articular rheumatism. Here the infectious agent, the streptococcus, is present in small numbers in areas only reached by a much diluted plasma. Before proceeding with a course of vaccine treatment in such a case it is, of course, desirable to remove, if possible, any existing probable primary focus of the infection, such as suppurating teeth roots, or a chronically inflamed gall-bladder or appendix. If this be not done the supply of bacteria within such entrenchments, and there usually safe from the effects of a course of vaccine treatment which would otherwise completely cure the rheumatic symptoms, will be very apt to cause relapses. Just as soon as the specific power of the blood has fallen from the point to which it was raised by the vaccine, some of the bacterial colonists, that must frequently escape from such foci, will infect the susceptible joint tissue and the disease will return. In some cases of chronic rheumatism it seems that the gastrointestinal tract in general is the focus from which the joints are invaded, and therefore, in all cases treated, it behooves one to see that it is working normally. Any one who is particularly interested in the subject of the vaccine treatment of rheumatism will find considerable in recent literature on the subject.

Another common chronic infectious process that is very suitable for vaccine treatment is acne, and, if one uses an autogenous vaccine made of the organisms that appear in great numbers in smears from pustules, good results will accrue. With ordinary precautions to see that a patient's general condition is good, vaccine will usually effect a cure of these cases in a few weeks. Some are undoubtedly very intractable, however, and although great improvement may always be got, complete cure seems impossible. Often, upon investigation, it will be found that the intractable cases have a carbohydrate intolerance, as evidenced by occasional appearance of sugar in the urine or at least an abnormally high percentage of sugar in the blood. Furthermore, severe relapses may often be traced to an increased consumption of sugar, as in candy or in grapes.

Furunculosis is an allied condition which is also most suitable for vaccine therapy, but it, even more than acne, is frequently much influenced by sugar intolerance.

In chronic infections of the nose, ear, or bladder, before thinking of vaccine therapy one must always determine whether there is not some predisposing condition requiring surgical treatment. An antrum of Highmore full of pus, a badly drained suppurating ear, a bladder with stone, are certainly not to receive vaccine treatment until the surgical indications have been fulfilled. Then if cure does not immediately follow, a vaccine can be reasonably employed.

INTRAVENOUS SALINE IN CHOLERA—A CONTRAINDICATION.

In the *Indian Medical Gazette* for May, 1916, MAJUMDAR points out that though true cholera is unknown in Port Blair, yet there are some very severe cases of acute diarrhea during the summer months which are clinically indistinguishable from real cholera. During the prevalence of these choleraic diarrhea cases some rare cases are found which become almost or quite pulseless and which do not react at all to intravenous injections, even with the exhibition of adrenalin or pituitrin.

The difficulty of recognizing such cases has now been practically done away with,

as every one knows, by the introduction of the routine testing of the specific gravity of blood before starting the saline, viz., that intravenous injection is not indicated with a specific gravity below 1060. Taking the specific gravity of blood is undoubtedly the surest and best guide in well-equipped hospitals, but the writer is afraid that this cannot always be availed of by medical practitoners who do not get such a sufficiently large number of cholera cases as to keep a proper cholera outfit with the test bottles. In such cases he has found the following a sufficiently good though a bit crude guide: if on holding the arm just above and below the elbow, the veins at the bend of the elbow become fairly turgid on the application of some extra pressure inward (*i.e.*, toward the bend of the elbow), the case should not be given any intravenous injection. The turgidity of the veins shows that they are fairly full and that the absence of the pulse is not so much due to any marked deficiency in the quantity of fluid in the vessels as to the loss of vascular tone and cardiac weakness from the severity of the toxemia; and introduction of any extra quantity of fluid is not only not indicated but is positively harmful, as it would entail an extra amount of work on the already weakened and embarrassed heart.

The writer is not aware if any one else has made use of this as a guide as to the advisability of an intravenous injection, but he has found it useful and demonstrated its usefulness to others.

THE INFLUENCE OF SALICYLATE ON METABOLISM IN MAN.

In the *Journal of Pharmacology and Experimental Therapeutics* for June, 1916, DENIS and MEANS state their results show from careful investigation that in the case of two normal men the administration of large doses of sodium salicylate (up to 6.6 grammes per day) produces an increase in the excretion of nitrogen, phosphates, and uric acid. In one case this increased nitrogenous metabolism was accompanied by an increase in the basal metabolism, and symptoms of salicylate intoxication (such as ringing in the ears). In the other case a much greater increase in the urinary excretion of nitrogen (which extended throughout the after period) was observed, but there was no increase in the basal metabolism and no symptoms of intoxication. In one mildly septic individual results similar to those secured in the second case were obtained. No change in the respiratory quotient occurred in any of these subjects.

DELAYED GASTRIC DIGESTION.

REHFUSS in the *New York Medical Journal* of June 10, 1916, reaches these conclusions:

1. There is a pathological deviation from the normal gastric secretory output in which there is either a delay in the appearance of the secretion, in reality delayed gastric secretion, or a delay in the evolution of the normal acid content, delayed gastric acidity resulting in delayed gastric digestion.

2. In a large series of studies on normal subjects this phenomenon was never encountered, indicating therefore that its appearance is unquestionably pathological.

3. It is not characteristic of any one type of gastric disturbance, being found in atony, gastritis, ulcer, carcinoma, and many of the functional disturbances, but its manner of evolution and the concomitant findings throw light on the disturbance.

4. The condition, in the absence of organic disturbance, is fairly frequent and can be adequately demonstrated by the fractional method.

5. It can be experimentally produced by the administration of hypertonic solutions, such as those of dextrose and sugar.

6. It may or may not be associated with motility disturbances.

7. In many of the extrinsic affections producing gastric disturbances, such as appendicitis, cholecystitis, intestinal adhesions, phenomena of delayed digestion with the ultimate evolution of high acid values and hypersecretion are found, although the initial period of gastric digestion indicates no such tendency.

8. The explanation of delayed digestion must be found in either a disturbance of the psychic or chemical factors dominating gastric digestion, although it is probable that mucosal changes (gastritis), the elimination of toxic substances (toxemias), a disturbance in autonomic balance (nervous), a disturbance in certain internal secretions, as well as an actual disturbance in chemical equilibrium, are capable of inducing secretory disturbances. Concerning these points Rehfuss will have some data to present in the future.

9. Many of these cases are rebellious to treatment; others can be relieved by treatment of the underlying cause.

THE TREATMENT OF HAY-FEVER.

The *New York Medical Journal* of June 10, 1916, states very truly that the subject of hay-fever and its treatment is literally of perennial interest to a large number of persons. A voluminous literature and extensive experimentation have been devoted to it. Hitchens and Brown (*Journal of Laboratory and Clinical Medicine*, April, 1916) have added a recent contribution concerning their own experience and clinical confirmation of earlier work, and summarizing the principles of treatment in the light of our present knowledge.

They divide the active treatment into measures to be taken two to three months previous to the hay-fever season and the control of the acute attack. For the former a survey should be made of all flowering plants within the patient's habitual surroundings in order to determine what particular pollens are responsible. The skin tests are to be made with the pollen of each to determine its specificity. The method of preparation of the pollen extract for treatment, as recommended by Hitchens and Brown, is as follows: The flowers are gathered and dried when pollination has just started. The pollen is collected on fine sieves and thoroughly dried for preservation. When the extract is to be prepared, the dry pollen is made up into a paste with physiological saline, and this is ground in a porcelain ball mill until the pollen grains are completely broken up. After centrifugation, the extracted protein is precipitated with acetone and the precipitate dried for future use. When ready to be used, the precipitate is redissolved in saline and the protein nitrogen is determined. The solution is then diluted so that each cubic centimeter will contain a certain definite fraction of protein nitrogen. This gives a fairly exact and satisfactory standardization of strength. These dilutions are preserved with trikresol, sterilized by filtration, and the sterility is tested.

Hitchens and Brown report sixty-two cases treated with such vaccines, of which eighteen were complicated with asthma. Of these eighteen, eleven were entirely relieved, three were considerably relieved, and three were not reported. Of the remaining forty-four cases, seventeeen were entirely relieved, eighteen were considerably relieved, and three were not reported. One patient who was treated in summer and autumn for two years was apparently cured. The two vaccines used by the authors were, in the spring, a mixture of pollens from red top, timothy, rye, and orchard grass, and in the fall, the pollen of ragweed alone. They call attention to the fact that in every case the possibility of a concurrent bacterial infection must be taken into account.

In regard to the treatment of acute attacks Hitchens and Brown have recommended immediate use of the vaccine which seems most likely to be efficacious, and at the same time a determination of the exact diagnosis as if there were no immediate symptoms. They condemn without reservation the practice of putting pollen extracts into the conjunctivæ for diagnostic purposes, and believe that the skin reaction, while perhaps not so delicate, is sufficient for clinical use and less dangerous.

These authors point out that many persons who died from injections of horse serum were found later to have had an anaphylactic asthma whenever they came near horses. There is no doubt that many persons are sensitized to animal odors and to the dust from animal fur; this is some-

times seen as asthmatic attacks after handling guinea-pigs in the laboratory.

Hay-fever has joined the class of anaphylactic phenomena which includes certain types of asthma and very likely many as yet undifferentiated forms of coryza. Immunization as well as a specific cure is certainly to be hoped for as a result of the manifold investigations being made along the lines on which we have commented.

A STUDY ON FOOD AND ITS FUEL VALUE.

In the *Journal of the American Medical Association* of June 3, 1916, WILSON and RATHBUN reach these conclusions:

1. In all institutions for the care of the tuberculous, food studies, including the caloric content of the dietary and food waste, should be carried on at regular intervals, preferably for one week or more during the various seasons of the year, and these records should be made available for comparative purposes.

2. Special training, though advisable, is not a necessary requisite for the carrying out of a successful dietary study in an institution. It is, of course, essential that the doctor who directs the work should be thoroughly familiar with the problem. It is only necessary that the person or persons who are doing the work should be intelligent, careful, and willing to follow conscientiously the "rules of the game."

3. The elimination of meats and eggs from the morning meal and the substitution of milk is a sound and justifiable economy.

4. The dietary of the tuberculous should be high in caloric value, but confined to three daily meals in all but exceptional cases.

5. Males consume more food than females, both in total amount and in number of calories per pound of body weight, but in spite of this fact females make much larger gains than males, enough so to indicate that rapid accumulation of weight is a characteristic of the female sex.

6. The avoidance of frequent repetition of foodstuffs is very important.

7. A four weeks' menu is of great aid to those controlling the dietary, and tends to do away with repetition.

8. The treatment of small children, in separate units, in institutions with adults, is both feasible and advantageous in that it results in economy of foodstuffs.

9. Small initial servings with as many "seconds" as may be desired are satisfactory to the patients and prevent much plate waste.

10. The plate waste in institutions for the tuberculous is of necessity higher than in hospitals for the insane or in general hospitals.

CITRATED MILK FEEDING FOR INFANTS.

In the *Practitioner* for June, 1916, POYNTON states that in his opinion it is a practical error to advocate placing infants on citrated whole milk from the first. He does not deny that such a method may be repeatedly successful, but it introduces a risk which is not worth taking. Pure cow's milk may not, even if citrated, suit a particular infant, and no one can tell beforehand when such an infant may appear. Why then use whole milk at first, when it is neither necessary nor safe? Why not, as Poynton originally suggested, begin with dilute milk until we have tested the infant's reaction to cow's milk, and then quickly increase the strength of the milk? One reason Poynton had for writing the original paper was to combat the danger of children being kept upon dilute milk too long, but he had no intention of suggesting that any risk should be taken in the opposite direction, seeing that if there is one lesson we have to learn in the feeding of infants, it is to begin hand feeding with caution. Personally, he thinks it is a great pity if any mystery should arise around the use of citrate of soda in infant feeding. It is very useful, especially in dealing with the poor, for it is cheap and handy. It is often very successful, especially for the correcting of milk dyspepsia, and has survived, he is delighted to think, more expensive and much vaunted "substitutes." Nevertheless, the

routine use and prolonged use are not advisable.

Some children take cow's milk quite well of the strength of 2 of milk to 1 of water, without the citrate, and when Poynton gets to that strength, he always tries and diminishes the citration with a view to its suspension.

The use of very dilute milk with large quantities of citrate of soda may result in general anasarca and convulsions. It was never intended for use in large quantities in dilute milk. If a child is so delicate that it is thought advisable to feed it upon very dilute cow's milk, it is not wise to try and increase the digestibility of the milk with large doses of citrate of soda. Sometimes it produces, however carefully used, an irritant diarrhea, although, with deference to Sir A. E. Wright and other writers on the subject, Poynton is just as convinced as he was ten years ago that its tendency is to cause constipation.

Many times he has noticed a precaution he insisted upon originally, but overlooked, viz., to increase the citrate in proportion to the milk, and not to the mixture of milk and water. The result of this oversight is to impair the value of the treatment.

Some writers have thought this drug causes undue nervousness, and the occurrence of epileptiform attacks is interesting in this relation. Poynton has not noticed any such result himself from the use of sodium citrate, but he has never, for example, given it to a healthy child of eight or nine months as a routine, and in the proportion of gr. ij to the ounce of milk. Obviously, to persevere, month after month, with what must amount to a large quantity of the drug when it is not the least necessary, may lead to trouble; if it does not, it deserves to.

Citrate of soda is not always successful, but it is very useful when properly given, and is not, as some would appear to believe, a mere substitute for bicarbonate of soda. Poynton personally prefers a solution to the tablets. He only uses it for a purpose, and not as a routine. He always tries to remember that the commencement of hand feeding should be cautious, and that it is not our successes but our failures that count. He does not advocate starting small infants on citrated whole milk, because, in his opinion, it is asking for trouble, which a little patience would obviate.

PEDICULOSIS PUBIS.

The *Canadian Practitioner and Review* for June, 1916, contains an article on this topic by MONTGOMERY. He recalls the fact that the old treatment for "crabs" was blue ointment, and it is wonderful, considering the number of clean, innocuous, effective parasiticides now available, how the use of this dirty application persists. It is not alone dirty, it is particularly liable, when employed in the genital region, to give rise to a severe dermatitis. This accident is due to both a peculiarity of the metal itself, and also to the situation affected. Mercury volatilizes at all temperatures higher than zero, and the higher the temperature the greater the volatilization, and the greater also its activity on the skin. As for the locality, the privates constitute a particularly warm corner, and the vapor is retained by the density of the hair and the fit of the clothing. The hair follicles in this region are also quite large and permit of the entrance of the metal, and the development of folliculitis. If the patient is fat and sweats a great deal, as fat people are apt to do, the trouble is still further accentuated. Further than the fact that the pruritus leads to rubbing and therefore to the more intimate inunction of the ointment, the presence of the disease itself does not lead to any hypersensitiveness to mercury, as at one time was thought. As showing that the location has more to do with the occurrence of the dermatitis than the kind of disease, one of the worst cases Montgomery has recently had was due to the application, by a very obese young man, of mercurial ointment for eczema marginatum.

In the treatment it is well to remember that these pediculi are provided with tracheæ or breathing tubes of most ex-

tensive distribution, through which many of the petroleum products easily permeate, and so smother them. Many of these petroleum products are very little noxious or not at all so to the human skin, are clean, and therefore form ideal means of ridding one of these pests. Xylol is one of these.

Xylol or dimethyl benzol is a clear fluid, with a peculiar, rather agreeable odor, and readily miscible in alcohol and ether. It has a wonderful power of penetrating tissues, a quality that makes it a favorite in clearing up microscopical sections. Sabouraud advises a lotion composed of:

Xylol, 50.00;
Ether,
Alcohol, āā 25.00.

M. Sig.: Moisten a wad of absorbant cotton with this and rub into the affected regions.

This will kill instantly and absolutely both the pediculi and the nits, but its application is quite painful, especially on the scrotum.

Creolin is a better petroleum product for this purpose than xylol. It is composed of orth-metra and paracresol in varying proportions. It is miscible in water, and as such is much used by poultrymen for killing insects. It may also be incorporated with fat to form an ointment. It is rarely noxious to the human skin. Montgomery has never seen it so.

Creolin, 10.00;
Vaselin, 90.00.

M. Sig.: Rub well in once a day.

This ointment not alone kills the insect, but is antipruritic and curative of any eczema that may be present.

Betanaphthol, in an ointment of five-per-cent strength, is also excellent for this disease, and for any incidental pyogenesis or eczema. Several severe poisonings have arisen in the employment of betanaphthol in scabies, but this was on account of the large areas, almost the whole cutaneous surface, treated. There is absolutely no danger in applying it to the much more restricted districts in pediculosis pubis.

In regard to the prognosis, it is as well not to be too quick in promising a complete relief from all disagreeable sensations, as the pruritus in some people endures long after the pediculi have been completely killed, and an eczema started by them may be as difficult and as tedious to master as in any other situation or beginning from any other cause.

The nits that give a knotty feeling to the hair are very annoying to some people. They may be slid off by using a comb dipped in vinegar.

DIET IN THE TREATMENT OF PULMONARY TUBERCULOSIS.

Writing upon this topic in the *Practitioner* for June, 1916, MUTHU states that to some extent the nutritive value of foodstuffs depends upon the physical and mental condition of the patient. The individual who takes his food with pleasure will assimilate it easily, even to the extent of nullifying any noxious qualities of the foodstuffs themselves; whereas he who has repulsion for his food will digest it under the most unfavorable conditions, and distil toxin from the most nourishing foods. This will explain why of two patients eating the same quantity of food, and living under the same environment, one will gain and the other lose. The gain of weight is not in proportion to the quantity of food taken. Nor is it always an index to the patient's improvement in the condition of his lungs. Muthu has seen active mischief continue in fat patients, and arrest of disease take place in those with slender frames. It is surprising how little women patients eat as compared with men and still gain weight.

The maxim "laugh and grow fat" is scientifically true. A patient with a placid temperament gets more nourishment out of a smaller quantity of food than one with a restless and irritable frame of mind. Behind food lies the power of digestion and assimilation, and behind these again the condition of the mind. Worry and anxiety, mental strain and stress interfere with the physiological functions of the stomach and healthy metabolism. The common saying

that a person cannot eat when he is in love has a profound truth behind it. A patient filled with a calm satisfaction and peace of mind does not want much to eat. Nature laughs at our scientific calculations, our food values in grammes and calories, and brings from her hidden stores materials wherewith to feed her children. Therefore the sanatorium physician, in arranging the diet of the patients under his care, should take into consideration their mental condition and temperament, their habits of life and idiosyncrasies. Only by discretion and individual attention, by neither underfeeding nor overfeeding them, by coaxing the thin to eat more and persuading the obese to eat less, and, above all, by placing them in a happy and cheerful frame of mind, can he successfully wage war against tuberculosis.

BLOOD-PRESSURE IN HEMORRHAGE AND ITS RESTORATION.

In the *American Journal of Physiology* of June 1, 1915, DOWNS reports experiments, his object being to determine what could be hoped for in the way of restoring blood-pressure and maintaining the circulation in cases of hemorrhage of varying degrees of severity. From these observations he draws the conclusion that so long as the hemorrhage has not been great enough to reduce blood-pressure to the "shock level" gratifying results may be hoped for from the intravenous administration of normal salt solution. When the blood-pressure has reached the level of shock, 30 mm. to 50 mm., restoration of blood-pressure and maintenance of the vital functions of the organism are a possibility, but cannot be expected with any certainty. In general it can be stated that in hemorrhage injection of amounts of saline solution in excess of the amount of blood lost will give the best results; in severe cases the use of large amounts of normal salt solution, 50 to 100 Cc. per kilogram of body weight, is most likely to be attended by a successful outcome. [These amounts seem to us very excessive.—ED.]

THE OCCIPUT POSTERIOR.

In the *Bulletin of the Johns Hopkins Hospital* for June, 1916, PLASS quotes the late Professor C. D. Meigs, who in speaking of these cases said: "Beware of meddlesome midwifery, and, if one is to err in these cases, better err on the side of waiting." This bit of advice, Plass thinks, is just as true now as when it was written, but the improvements in aseptic technique, by eliminating many of the former horribly fatal results, have led to haste in obstetrical work. The knowledge of when to interfere is as important as the mere technique of performing the usual forceps operations, but good judgment is much rarer than good operating ability. The profession generally seems to have been so impressed with the statement that occiput posterior positions will very frequently need operation that they do not wait to see whether the individual case will make that demand, but proceed to deliver instrumentally on the smallest provocation, and often on none whatever.

The more conservative writers have reported a small operative incidence. Thus, Naegele noted 11.8 per cent forceps deliveries, P. Dubois 7 per cent, Battaillard 10 per cent, Dupré 3.64 per cent, Botkowskaia 10.75 per cent in primiparæ and 2.5 per cent in multiparæ. Corinin gives the incidence of spontaneous labor as 96.23 per cent, Dimitroff as 93.9 per cent, Mosher as 90 per cent, Lacrotte as 87 per cent. In these series the figures were taken from cases which were normal in every other respect, and indicate the interference necessary in uncomplicated occiput posterior labors. In an early section Plass has considered 11.02 per cent of his operative deliveries as possibly due to the position.

In contrast to these figures indicating that the uncomplicated occiput posterior should nine times out of ten be delivered spontaneously, Bill reports that 50 per cent of his cases of occiput posterior needed forceps, and details rather incompletely 137 cases in which the double application of forceps was employed. Many of these operations were done with the head still

high in the pelvis and, judging from the context, through a partially dilated cervix. Again, Lukins has recently stated: "The ideal plan of management in occiput posterior positions, provided the patient can be seen and the diagnosis made sufficiently early, is to hasten cervical dilatation by manual means and accomplish immediate version by combined internal and external manipulations."

The statement in the last paragraph illustrates what an unenviable reputation the position in question enjoys, and what radical methods are introduced in order to obviate difficulties which really do not exist. Evidence might, indeed, be introduced to show that there are physicians who seriously advocate the employment of the Cæsarian section in the absence of any other indication. In the light of the writer's experience it is difficult to see how such errors have arisen.

Of the many published methods of treating the complication, if there really be one, very few have any sound reason to commend them. Postural treatment, with the patient lying on the same side as the occiput or on the other side, as is variously recommended, is certainly of little value, as is attested by the lack of unanimity of opinion with regard to which side is preferable.

Correcting the obliquity of the uterus by means of pads and binders seems futile. Manual rotation of the head at the superior strait and the correction of improper flexion digitally have a sound basis, but are rarely indicated. O'Brien's method of rotating the mother around the child, by fixing the latter manually, seems not only awkward but useless, when one considers how readily the reverse can be accomplished. The double application of forceps distinctly has a place in the treatment of the unrotated occiput, but is indicated only when rotation cannot be accomplished manually. The single application of forceps with the blades reversed, or reversing, has no distinct field of usefulness when there are so many simpler methods that have not the obvious disadvantages of these procedures.

The chief point in the treatment is to give nature a chance, and not to fall into the common mistake of thinking that the position itself will cause trouble. A large portion of the cases will need no assistance, and the majority of those that do demand help will offer no great difficulty. Spontaneous rotation will usually occur, but if it does not, at least 90 per cent of the heads can be rotated manually to the transverse or obliquely anterior positions and then delivered by a single application of the forceps. Podalic version is useful in certain cases, but should be reserved for those in which the indication for delivery arises while the head is still at the brim and the choice lies between high or floating forceps and version. High forceps are being more and more discarded, as operators realize the excessive fetal mortality usually consequent upon the procedure. Rarely does the posterior position of the occiput itself call for interference while the head is still at the brim, and the exercise of a little more patience will usually be rewarded by its descent and eventual anterior rotation. Cæsarian section distinctly has no place in the treatment, unless there is some other definite indication, such as contracted pelvis, and then the occiput posterior is not what demands the section.

As has already been stated, Plass views these cases with equanimity, and, in consequence, the patient is treated exactly as if there was any other uncomplicated vertex presentation. He does not insist that she assume any particular position, nor does he attempt to apply any abdominal pads or binders. No attempt is made to correct improper flexion or to rotate the occiput forward. The spontaneous cases are, of course, simple; if the occiput has rotated into the hollow of the sacrum, it is permitted to be born as such. There is probably, on these latter cases, a greater possibility of perineal lacerations, but these are never extensive enough to be of serious moment.

In applying forceps a certain routine is followed. In the first place, the vulva and vagina are manually dilated until they

admit the clenched hand; a cephalic application of forceps is then made, the posterior blade being introduced first over the posterior ear with the hand in the vagina definitely feeling the ear; the other blade being introduced posteriorly and rotated over the face to lock with the first. The patient is allowed to come partially out of the anesthetic while short intermittent but frequent tractions are made. If the occiput is directly anterior or posterior, a pelvic (of course, also, a cephalic) application is made and the head delivered directly. If the occiput is obliquely anterior or transverse, a cephalic application is made, and during the tractions a slight rotary movement of the blades accelerates rotation. With the occiput still obliquely posterior, the hand in the vagina grasps the head securely between the four fingers and the thumb, and rotation is attempted, the occiput being turned as far anterior as possible. The position of the head is immaterial, for this procedure can be successfully carried out even when the head is tight against the perineum. During the maneuver the head may be pushed up slightly, but this is rarely a disadvantage. In rather rare cases the head will not remain in its new position and falls back to the obliquely posterior position. Here one can attempt the double application with little better chance of success, or deliberately apply as for the opposite anterior position and rotate through 45 degrees so that the occiput becomes directly posterior. Although this procedure cannot be very warmly recommended, it has a certain field of usefulness, especially in the class of cases just mentioned and in others, particularly in patients with relaxed outlets, where haste is imperative. The Scanzonian or double application of forceps is rarely necessary. The blades are first applied for opposite anterior position and the occiput rotated forward to a transverse or an obliquely anterior position while downward traction is employed. The blades are then removed and reapplied for the new position, and delivery is completed with the occiput under the symphysis.

THE SECRETION AND EXCRETION OF SALVARSAN AND NEOSALVARSAN.

In an interesting paper read before the Society of Public Analysts Mr. John Webster, F.I.C., presented the results of some analyses showing the relative amounts of arsenic found in the various organs after injections of salvarsan and neosalvarsan. Special attention was drawn to the relatively very high proportion of arsenic present in the kidneys. In one case a post-mortem examination had shown that nephritis was present. Various analyses of urine were made showing the variability of the rate of excretion. Analyses of human milk from two cases of salvarsan treatment were referred to, and the results indicated that after a dose or repeated doses of salvarsan the milk of a lactating woman is entirely, or almost entirely, free from arsenic. A minute trace of arsenic was found in one specimen only. Mr. Webster expresses the opinion that any official results to the syphilitic child fed on such milk cannot be due to the presence of salvarsan or other compound of arsenic present in the milk of the mother.—*Lancet,* May 13, 1916.

PARALYSIS DURING PASTEUR ANTIRABIC TREATMENT.

In the *Journal of the American Medical Association* of June 3, 1916, FIELDER reaches these conclusions:

1. Paralysis complicating the Pasteur antirabic treatment is very rare, but doubtless occurs in mild form more often than is known. It affects adults chiefly, young children almost never.

2. The prognosis is good in cases of mild or moderate degree, but the mortality among the severe cases is high.

3. The administration of antirabic treatment is therefore not entirely devoid of risk.

4. The possibility of the occurrence of paralysis in any particular case, however, is so slight that it should not deter us from using antirabic treatment in those who evidently need it. A person bitten by a rabid animal is much more likely to de-

velop rabies, which is certainly fatal, than paralysis, which usually ends in recovery.

5. The slight risk of paralysis should always be explained to those who are inclined to insist on antirabic treatment in the absence of clinical or laboratory evidence that the biting animal was rabid.

6. In most instances this paralysis is caused by the antirabic treatment itself (fixed virus infection, or toxin, or both). It is not often due to street virus infection modified by treatment. Its incubation is shorter than that of most cases of street virus rabies.

7. Variations in the strength of the fixed virus used are probably a factor in the etiology.

8. Personal idiosyncrasy is an important predisposing condition.

TREATMENT OF DEVASCULARIZED INTESTINE.

DAVIS (*Interstate Medical Journal*, May, 1916) notes that the usual surgical practice, in the presence of perforating wounds at the junction of the mesentery and the bowel, is resection of the segment of intestine involved. This procedure is based upon data, gained from pathologic study and surgical experience, which indicate that, for practical purposes, the arteriæ rectæ passing to the intestine from the parallel vessels of Dwight are end arteries; that while, anatomically, anastomoses between adjacent vessels may be demonstrable, they cannot be depended upon to maintain an efficient blood supply in case the artery to a particular segment suddenly becomes occluded.

Recently published results from experimental laboratories do not appear to be in harmony with these generalizations. It is reported that segments of intestine (ileum near ileocecal junction) several inches in length may be devascularized by ligation of the mesenteric vessels at the border of the bowel without impairment of function, especially if the devascularized segments are protected by a wrapping of omentum. In regard to this Horsley and Coleman say: "It has usually been taught that if a bowel is deprived of its nutrition from the mesentery even for a short distance, a resection should be done. These experiments demonstrate that, in the dog at least, a loop of 4 or 5 inches of intestine may be deprived of its blood supply through the mesentery and may still survive if omentum is wrapped around it and fastened in position. In long abdominal operations, where for some reason the mesentery has been severed from the bowel and the patient's condition does not admit of a resection, it appears justifiable to wrap the omentum around this portion of the bowel and stitch it to itself and the intestine with a reasonable expectation that the segment will be properly nourished through the omentum.

"Azara concludes from experiments on fourteen dogs that separation of the mesentery over a stretch of 5 cm. along the margin of the bowel does not compromise it beyond repair, and that up to this distance, therefore, treatment may be conservative. With separation over a stretch of 6 cm. the function of the intestine is so seriously compromised that resection is required unless there is a strip of mesentery at least 1 cm. wide still attached to the intestine. Devascularization of a segment of intestine 18 or more centimeters in length, even though the mesentery be preserved for a distance of 3 cm. from the bowel, entails inevitable gangrene. Ligation of the vessels supplying segments of bowel not exceeding a length of 15 cm. at a distance of 3 cm. from the intestine is never followed by gangrene, but occasionally functional disturbances are caused by the development of cicatrix. According to Scandola interference with the blood supply of a loop of intestine affects the mucosa primarily. Whenever the injury to the intestine is limited to the mucosa, complete recovery is the rule. Quite serious changes in the mucosa may retrogress, but pronounced alterations in the outer layers inevitably prove fatal. Complete restitution may occur in a loop of intestine the blood supply to which has been interrupted for six hours.

In normal dogs a loop of small intestine

one inch in length may be completely separated from its mesenteric blood supply with relative safety, although gangrene with perforation and general peritonitis may occur, and replacement fibrosis of the devascularized segment with consequent narrowing of the bowel lumen may occasionally be expected. The frequency of one or the other of the above accidents increases rapidly as the length of the devascularized segment is increased, until at a segment length of 4 inches gangrene with complete destruction of the involved loop or replacement fibrosis with contraction becomes the rule.

Wrapping omentum about devascularized bowel appears to influence the final result but little, certainly not enough to justify the confident assertion of Horsley and Coleman, whose error and the reason therefor have been demonstrated by the results of the experiments in Series I and II of this paper. The value of omentum in walling off inflammatory foci is universally acknowledged, and the abundant vascular channels which may develop in omental adhesions justify the Talma operation; but neither of these conceptions may be applied with safety to the conditions now under discussion. Gangrene is not an inflammatory process; it is characterized by the absence of inflammatory reaction in the tissues directly involved. Such tissues die. The fate of a segment of intestine suddenly deprived of its mesenteric blood supply depends entirely on the size, number, and patency of its intramural collaterals, for the changes following devascularization occur so rapidly that there is no time for vicarious revascularization through fresh adhesions. If a devascularized portion of intestine becomes gangrenous just after it has been wrapped in omentum, the intestinal contents are poured directly into the enclosing omentum and the resultant peritonitis is only a matter of minutes. If the mucosa only is involved, restitution may occur independently of enclosing omentum, though if the defect is large cicatricial contraction may be marked. The deeper the defect in the intestinal wall the more imminent is perforation, or failing the latter, cicatrix with contraction. Omentum wrapped about devascularized intestine cannot avert gangrene in the slightest, and, should gangrene occur, it may prove efficient if the gangrenous area is small in extent, but it cannot be depended upon to confine the intestinal contents and prevent peritonitis.

Among the factors which may cause variation in the results of the separation of equilinear segments of intestine from their mesenteric blood supply may be mentioned at least four: First, the quantity of normal intramural channels: thus injury at the upper end of the jejunum should offer a better prognosis from the standpoint of the maintenance of the integrity of the bowel than similar injury at a point low down in the less vascular ileum. Second, the elasticity of the intramural channels; gangrene might be expected to occur in individuals with arteriosclerosis more commonly than in those not thus afflicted. Third, the circulatory pressure: patients in shock from loss of blood or other cause, or who are suffering from some wasting disease, such as typhoid fever, offer a less favorable prognosis than individuals who, excepting for the lesion at the mesenteric border, are normal. Fourth, and probably most important, is the factor of thrombosis, and especially septic thrombosis, since septic thrombi frequently become propagating thrombi. No matter what the number or elasticity of the intramural vessels and regardless of circulatory pressure, thrombosis will insure complete devascularization, and therefore gangrene, wherever it involves any appreciable extent of intestine.

Segments of small intestine which have become separated from the mesenteric blood supply for a distance of 4 inches or more demand resection. Shorter segments may be treated conservatively, though the risk is great, and a fairly safe rule would be to resect all devascularized segments which exceed one inch in length. Segments less than an inch in length will rarely require resection, although there is a definite risk in non-interference.

To depend upon omentum to maintain

the vitality of devascularized loops of bowel is to invite disaster.

Dangers associated with the conservative treatment of devascularized segments are: Gangrene with perforation and peritonitis; or intestinal obstruction by contracting scar tissue.

POSITIONS OF ELECTION FOR ANKYLOSIS FOLLOWING GUNSHOT INJURIES OF JOINTS.

JONES (*British Medical Journal,* April 29, 1916) observes there are certain injuries to joints occurring after gunshot wounds which must inevitably end in bony ankylosis. From their very nature some of these will not admit of excision.

When a joint has been shattered, and the muscles governing it have been in part or wholly destroyed, excision is not merely difficult from the point of view of surgical technique, but often results in a flail articulation which renders the limb quite useless. This is especially the case when such joints as the shoulder, elbow, and wrist are concerned. Excisions of the upper part of the humerus are frequently practiced as a conservative procedure in the presence of acute or persistent sepsis, especially at the French front. This may be very necessary, but the resulting condition will at a later date require further surgical intervention. The question has often been put, "What should be done with these flail joints, and if ankylosis is to be expected, in what position should the joint be placed in order to be of the greatest use to the patient?" It may be of service to indicate the conclusions as to the positions for ankylosis to which experience has led.

If the shoulder is to become ankylosed the arm should be abducted to about 50 degrees. The elbow should be slightly in front of the coronal plane of the body, so that when it is at right angles and the forearm supinated, the palm of the hand is toward the face. The arm is placed in this position while the scapula retains its normal position of rest.

If the arm be correctly placed, the hand can be brought easily to the mouth by bending the elbow. Further, the humerus being fixed to the scapula at the angle indicated, the arm can be lifted to a considerable height by scapular action; moreover, pockets can be reached, the hair brushed, and the patient can pick up a plate or cup without spilling the contents.

The arm should never be kept to the patient's side if ankylosis is feared, for in such a case the functional result must be most unsatisfactory; not only will it be difficult to reach many parts of the body, but difficult also to reach across a table or to perform many simple movements constantly recurring in every-day life.

Flail shoulder-joints also should be ankylosed in the position described, and joints which have been allowed to ankylose in an adducted position may require osteotomy of the humerus high up to correct this faulty position. The shoulder-joint should never be allowed to become fixed at right angles to the side in adults, as in that case the patient will be unable to bring his arm down to his side. It is to be clearly understood that the writer is dealing with injuries to soldiers and sailors, and not with children, in whom other means can be adopted owing to anatomical considerations.

As to the elbow-joint the proper course to adopt will depend upon the patient and his calling, but by far the greater number of men would prefer the fixation to be at just below a right angle—that is, about 100 degrees. It is important to bear in mind that in cases in which both elbows will become ankylosed it is necessary to fix the one at an angle of 80 degrees and the other at 100 degrees as recommended for one-sided trouble. The ankylosis commonly met with at 130 degrees is not useful.

This position enables the patient to move his hand to his mouth, button his clothes, brush his hair, and to reach over a table. At an angle less than a right angle it is certainly more easy to get the hand to the mouth and to various parts of the head, but limitations in other directions more than counterbalance these advantages.

If the movements of pronation and supination are lost, the radius should be

fixed midway between pronation and supination. The hand is more useful for dressing and eating and for manual labor in this position. A minor advantage is that of appearance.

All injuries of the wrist-joint should be treated with the wrist dorsiflexed. This is a priceless surgical axiom, the neglect of which is grave. It is an urgent necessity where ankylosis is expected, or where even limitation in movement is likely to occur.

The common deformity of palmar flexion occurs when no splint is applied, or from the use of a straight splint; in all cases in which the arm and fingers are kept on such a splint palmar flexion of the wrist occurs, and this condition is a lifelong handicap to the usefulness of the hand.

The grip of the fingers is diminished if the wrist is palmar-flexed. The strong flexors overpower the extensors of the fingers, and in consequence proper coördination of the finger movements is impaired. The grasp of the hand is strongest when the wrist is in the dorsiflexed position, the balance between the flexors and extensors is better preserved, and the coördinated movement of the fingers is secured.

The splints required are simple.

In proof of the importance Jones attaches to the dorsiflexed ankylosed wrist, he states that he always restores hyperextension of the ankylosed joint from the position of flexion by manipulation or incision. This invariably improves the grip of the fingers.

Apart from the impairment of function, a flexed wrist is unsightly.

As to the hip, ankylosis should be encouraged in a position of very slight abduction, with thigh extended and very slight outward rotation. The common deformity in ankylosis of the hip is flexion, adduction, and internal rotation, which is the characteristic position we find in an untreated or imperfectly treated tuberculous hip-joint; it leads to lumbar lordosis and an ugly limp. Adduction deformity brings the limb too near the middle line, interferes with the normal position of the sound limb in walking, and, by involving abduction of the sound limb, interferes also with a free gait.

If the hip-joint is ankylosed in the fully extended position, lordosis and the consequent trouble from backache is avoided, and there is freer pelvic movement in walking if the thigh is slightly abducted.

The limb should be very slightly rotated outward, to avoid the unsightly lift of the pelvis as the patient rises on his toes when walking, due to the immobile condition of the hip-joint. This gives an easier walk than if the toes are pointed straight forward.

Very good reasons may be given in favor of slight flexion from the point of view of elegance in repose and that of ease in mounting stairs. Due weight should be given to these arguments, but in case of war injuries the straight position obviates many risks. Ankylosis, as we know, is not necessarily bony; when it is fibrous the tendency is for the flexion angle to increase by exercise. The incidence of the body weight on a slightly bent knee, unless the ankylosis is sound and bony, will increase the flexion. The position, therefore, is mechanically a weak one for carrying body weight. Even when new bone is forming its complete consolidation is sometimes a slow process, and if the surgeon places such a knee in a slightly flexed position the degree of ultimate flexion is often much greater than he would wish. The advantage of increased strength and stability assured by an extended joint will generally outweigh all other considerations.

The foot should be kept at a right angle with the leg, so that the sole impinges on the ground in a slightly varus rather than a valgus position.

If the reader will recall the ankylosed ankles he has seen, he will remember that most of them were in a valgoid position. A varoid position conduces to a strong type of foot; a valgoid (flatfoot) to a weak foot, and all the disability associated with erroneous deflection of body weight.

In gunshot wounds and other injuries of the tarsus and metatarsus, the deformities to be feared correspond to the common static deformity of flatfoot—that is to say, to pronation at the midtarsal joint, flatten-

ing of the longitudinal arch, and sometimes flattening of the transverse arch associated with pain in the metatarsophalangeal joints. Callus exudation added to plantar malposition results in a very crippled foot. In all gunshot injuries of tarsus and metatarsus the surgeon should take care during the later stages of healing not to bandage the sole rigidly against a flat foot-piece, for if that be done every irregularity of bone will conduce to callosity when walking is resumed. It is necessary, therefore, at this stage to adjust a splint having an inside arch padded to conform to the natural shape of the foot. Eversion of the foot should be guarded against, and the hollow of the arch should when possible be emphasized. Later, the heel of the boot should be raised on the inner side to obviate eversion, and if the metatarsals are involved, in order to allow of early walking, a bar should be placed across the sole of the boot behind the tread. Light duty can then be undertaken at a much earlier date.

In answer to the question, "What should be done with flail joints?" Jones says: "Secure by operation an ankylosis in the most useful position." The only exception is in the case of the hip-joint, where by means of simple mechanism a very useful limb may be obtained in spite of the joint being flail.

A REVIEW OF THE POSTOPERATIVE CASES OF PNEUMONIA IN THE SECOND SURGICAL SERVICE OF THE NEW YORK HOSPITAL.

BANCROFT (*Medical Record*, March 25, 1916) states that during the year 1915 there have been 15 cases of pneumonia in 1413 operations, or 1.06 per cent. Of these cases of pneumonia seven had died, or 46.6 per cent, giving a total mortality of 0.5 per cent from this complication.

A brief history of each of these cases and of the operation performed showed that of the seven fatal cases three deaths followed general peritonitis; one of these patients died at the end of the third day, another on the twenty-fourth day, of pneumonia secondary to pulmonary embolism, and the third died of pneumonia secondary to suppurative pleurisy, due to subphrenic abscess. The other four deaths were due respectively to typhoid appendicitis, strangulated inguinal hernia, pelvic inflammatory disease, and cholecystitis, and should have been avoided.

The diagnosis of the eight cases that recovered was chronic appendicitis (three cases), ventral hernia, gastrostomy for carcinoma of the esophagus, inguinal hernia and hypertrophied tonsils, inguinal hernia, and cholelithiasis. Two of these cases were lobar pneumonias and six bronchial pneumonias. The onset occurred on the first day in three cases, and in one case each on the second, third, fourth, fifth, and eighth days. All persisted from four to eight days and subsided by lysis. The *x*-ray taken in two cases showed signs like those of tuberculosis. The age of the youngest of this series was four years and the eldest sixty-two.

Every one of the 15 operations was a laparotomy. The shortest operation lasted fifteen minutes and the longest sixty minutes, the average time being thirty-six minutes. The time of the year did not seem to be a factor, since three cases occurred in March and three in August, and one each in the other months. Three of the fatalities were in cases of severe peritonitis, and the pneumonias might have been of the terminal type.

The anesthesia in 11 of the fatal cases was gas and ether (Bennett inhaler, followed by the drop method), ethyl chloride and ether in two cases, gas and ether followed by chloroform in one case, local novocaine followed by gas and oxygen in one case.

The bacteriology of these cases was not studied.

One of the greatest factors in the etiology of postoperative pneumonia was the operative nightgown. Many of the patients entering a hospital were accustomed to sleep in heavy woolen or flannel underwear; after entering the hospital they were forced to wear light muslin gowns open up the back. Often when the patient

was on the operating table there was only a couple of layers of cotton between the metal operating table and the patient's unprotected back. Hospitals should provide undershirts of different weights, so that the patient used to heavy weights might be property protected until he was well out of the influence of the anesthetic.

THE RELATION BETWEEN CHRONIC MASTITIS AND CARCINOMA OF THE BREAST.

MacCarty and Mensing (*Saint Paul Medical Journal*, May, 1916) note that in the mammary acinus, which is the structural and functional unit of the mammary gland, there are two rows of cells—an inner row composed of cuboidal or columnar cells, the long axes of which are parallel to the radii of the acinus, and an outer row, the cells of which are oval or spheroidal. The latter cells lie between the cuboidal or columnar cells and the connective tissue stroma, with their axes parallel to the circumference of the acinus. The prominence of the outer row varies considerably in different specimens, but it is invariably present in the condition of chronic mastitis.

In chronic mastitis the cells of the inner row are found frequently displaced toward the center of the acinus; they are frequently exfoliated and necrotic. In the presence of such a condition of exfoliation or displacement the cells of the outer row are hypertrophic and often hyperplastic. The cells of the inner row are occasionally absent, and the lumen of the acinus is soon to be filled with hyperplastic cells of the outer row. The latter cells present morphological characteristics which make them indistinguishable from the cells of mammary carcinoma, although they are not present in the stroma.

The line of demarcation between the acinus and stroma is sometimes confused, thereby making it impossible to accurately state whether one is dealing with carcinoma or not.

The presence of two rows of cells, namely, the differentiated inner row and the undifferentiated or partially differentiated outer row, has been termed primary epithelial cytoplasia. The absence of the differentiated cells plus the presence of hyperplastic undifferentiated or partially differentiated cells has been termed secondary epithelial cytoplasia, and this condition, plus the invasion of the stroma by the hyperplastic cells, has been termed tertiary or migratory epithelial cytoplasia. Therefore we have three distinct histologic pictures in chronic mastitis: the first is characteristic of all chronic mastitis, the second is characteristic of some specimens of chronic mastitis, and the third, in its early stages, is associated with the first and second condition. The third condition is the recognized picture of carcinoma, the first is a recognized benign condition, and with our present knowledge the clinical significance of the second condition is still undetermined, although it represents a precancerous histological picture.

Practically one in every five patients with pathologic breasts may be saved from radical operation if the surgeon is accompanied in his work by a competent surgical pathologist.

There are five points to be borne in mind from the facts which have been briefly presented:

Carcinoma of the breast is always associated with chronic mastitis.

The percentage of legitimate error in the clinical diagnosis of simple chronic mastitis and carcinoma is respectively 62.7 per cent and 23.9 per cent.

The percentage of legitimate error in the clinical diagnosis of the condition of the axillary glands is 36.9 per cent.

There are three distinct histological pictures in chronic mastitis. At one extreme there is a benign condition, and at the other extreme there is a malignant condition. The mean, which may be easily recognized, is at present doubtful.

The association of the two conditions is too close to allow a consideration of the one without the consideration of the other.

From a standpoint of advice from the surgical pathologist certain deductions may be drawn from these facts.

The following plan, which suggests itself to the writers after an extensive experience with the pathological conditions to be dealt with, and also an intimate association with the activities of surgeons, seems to be logical.

The condition in the breast which is associated with classical clinical signs of carcinoma should be treated radically.

In doubtful cases in women near or over thirty-five years of age, the entire mammary gland should be removed for immediate examination. If primary or secondary hyperplasia be present, nothing more should be done; if tertiary hyperplasia be present, a radical operation should be performed.

In doubtful patients near or under thirty-five years of age a wide sector of the mammary gland, including the pathological conditions, should be removed for examination. If primary hyperplasia be present, nothing more should be done. If secondary hyperplasia be present, the rest of the mammary gland should be removed, and if tertiary hyperplasia be present the radical operation should be accomplished.

This plan avoids incision of tumors. It removes the possibility of unnecessary radical operations and the consequent physical and psychic embarrassment. It provides for a scientific means of determining more accurately the stage at which cancer may be cured by surgical operations, and the extent of the operation which is necessary to effect such a cure.

HALLUX RIGIDUS.

PAINTER (*Boston Medical and Surgical Journal*, May 18, 1916) notes that hallux rigidus is caused by a hypertrophy of the bone on the dorsum of the distal end of the first metatarsus. He believes it is usually caused by the seam of the shoe which presses continuously against this point while the foot is in action, and this pressure is increased by the "break" in the shoe which necessarily comes next to the point of flexure of the foot. Long before the patients have any idea of a beginning rigidity of their great toe joints, they have often had the skin rub off of the top of these joints by breaking in new shoes. Women are not so subject to this condition because the leather from which their shoes is made is not so heavy, nor do they use their feet as much. Painter has shown there are marked variations in the length of the metatarsal bones, amounting in many cases to as much as three-eighths of an inch. Furthermore, this difference was frequently observed between the two feet of the same individual, thus accounting for the fact that hallux rigidus is very often a unilateral deformity. Sometimes the phalanges showed the variation; rarely was it observed in the bones of the posterior tarsus.

If there are these differences in the lengths of the metatarsals and phalanges in persons who have feet of the total length, breadth and thickness that would make their feet conform to certain sizes of ready-made shoes, it is obvious that the "breaks" in the shoe cannot come at the points where they would come under ordinary circumstances if either the metatarsals or the phalanges have departed to any degree, however slight, from the usual. It is at once apparent that a difference of a quarter-inch in the length of the first metatarsal would make the metatarsophalangeal joint come at a different place in the shoe, and when the shoe has been worn long enough to have the "break" develop in the leather at that point of flexure, it will be seen that it comes close up to the juncture of the vamp with the upper. When this occurs at this place the stock is stiffer because it is near a seam where there are two thicknesses of leather stitched together with a double layer of lining. When the person comes up on his toes under such circumstances there is much more material to be crowded down against the joint, and the effect is multiplied by the number of steps the person takes. The osteoblastic cells in the area thus irritated proliferate, forming a bony overgrowth in this region, which mechanically obstructs the dorsal movement of the phalanx upon the metatarsal, and this in turn keeps the joint in a state of chronic irritability and spasm. Not

being able to bend at the mediotarsal joint in a dorsal direction, this motion must be secured elsewhere, and it is obtained at the first phalangeal articulation of the great toe. The evidence of this is seen in the hypermobility of this joint, and from the fact that the shoe usually shows a small round hole worn immediately beneath this articulation in the sole, for now the pressure in walking is brought under this joint instead of beneath the metatarsophalangeal articulation.

There is generally a ridge on the dorsum of the shoe over the metatarsophalangeal joint, indicating where this articulation is thickened. If the deformity is unilateral, as is frequently the case, a comparison of the two shoes brings out these two points very quickly. It will almost always be noted that this ridge on the dorsum of the metatarsophalangeal articulation comes directly beneath or almost directly beneath the point where the seam marking the juncture of the vamp with the upper lies. It may happen, of course, that the particular pair of shoes the examiner sees on the patient may not show this, but further inquiry and examination may reveal it in other shoes that the patient wears or has previously worn. It is not uncommon for the patient who suffers from this deformity to have a small shoe store in his possession, which represents his attempt to find relief in shoes for the trouble he has. He has often had a good deal of trouble in getting shod, for the reason that a new shoe chafes the dorsal surface of the distal end of the metatarsal, and in breaking in a new shoe the skin is often abraded over this joint.

In the management of this condition several lines of treatment are open for consideration. The conservative treatment consists of custom-made shoes, so constructed as to give no pressure over the metatarsophalangeal joint, together with a plate fashioned after the manner of the ordinary flatfoot support, supplemented by a steel tongue the width of the great toe on its plantar surface and nearly as long as the toe, which projects from the front of the plate, and is, in fact, a part of it. This prevents any attempt at motion in dorsiflexion at the mediotarsal joint, and therefore stops irritation of the cartilage and its consequent proliferation. The use of the plate will be unnecessary after five or six months, and the patient will generally find himself comfortable, and, with custom-made shoes, may expect to get on without further difficulty. This line of treatment is applicable to the earlier cases before dorsiflexion is much restricted.

The more abnormal cases, in which there is no dorsiflexion, possibly require more radical treatment. This means operation. The ridge on the dorsum of the metatarsal is chiseled away or a regular Hüter operation is performed. In cases in which there is ground to suspect any osteoarthritic diathesis the latter is preferable. An English orthopedic surgeon has excised the sesamoids beneath this joint for the relief of these symptoms with very gratifying results, it is stated, but just what surgical indications is met by such a procedure it is difficult to see.

MALUNITED AND UNUNITED FRACTURES.

JONES (*British Medical Journal*, June 10, 1916) observes that the conditions to which the terms "delayed union" and "non-union" are applied may be difficult to distinguish because often we find that, even after months, osteogenetic changes leading to consolidation will take place in a fracture considered to be permanently ununited. The article contains so much of value that we think it wise to publish it almost entire.

For various reasons, some of which are still unknown, a certain proportion of fractures take longer to unite than others. There may be several weeks of apparent inactivity in callus formation, and then consolidation occurs quite rapidly. If a practictitioner takes care to maintain a good length and accurate alignment, he should look forward cheerfully to a happy issue even if union is delayed. As a rule, this is exactly what he does not do. At the end of the fifth week he begins to feel nervous, he disturbs the bone ends, modi-

fies his methods, and by degrees transforms into a permanent disability a condition which merely demanded patience.

Delayed union is most common in the middle of the femur, in the humerus at the junction of the middle and upper third, and in the tibia and fibula at their lower third.

In many cases there is an obvious reason for the delayed union. Very often it is not due to malposition; it is, indeed, quite remarkable how often in delayed and ununited fractures the bones are almost automatically opposed.

An obvious and frequent cause is inefficient reduction. Another cause of delayed union is circular compression of the limb by splint and bandage.

A fundamental principle in the treatment of fractures is to secure and maintain good length and good alignment, and in attaining these ends care should be taken that the circulation of the limb shall be in no way hampered. The splint used should be so constructed that after the bandage is applied the fingers can be readily introduced between it and the lateral aspect of the limb. It is because plaster generally fails to secure length and adequate blood supply that it is a prolific source of delayed union and ununited fracture.

Fractured adult bones are never firm after four or five weeks, as text-books would lead us to infer.

In the case of the lower limb, where the effect of body weight has to be considered, to underestimate the period of consolidation is to invite disaster.

If a case of delayed union is first seen in the seventh or eighth week we need do no more than make quite sure of good alignment, length, and circulation. Nature will do the rest.

If a long time has elapsed the need for action is more pressing, and we must endeavor to transform the indolent callus into an osteogenetic factory, so that bone may be generated. Jones advocates the method suggested by H. O. Thomas, and named by him "percussion and damming."

As an example he cites a case of non-union of the femur with shortening, probably of two or three inches. Under an anesthetic the soft fibrous callus was broken down and the fractured ends were turned toward the skin and beaten with a mallet; a pulley was then applied to the limb, and as much length as possible gained. A Thomas knee splint was then adjusted and the extension maintained. Two pieces of India-rubber tubing were tied around the limb, one three or four inches above the fracture, and the other at an equal distance below. They were kept on, to begin with, for about twenty minutes each day until they could be borne for several hours at a time. They were kept tied sufficiently tight to produce considerable swelling and stasis. In two or three weeks callus was thrown out, and the osteoblasts began actively to produce bone. Local congestion between two india-rubber tubes is much more effective than congestion by one proximal tube. Jones recalls many cases in which bones that had remained ununited for several months became firmly consolidated after use of this simple devcie (invented by Thomas and described twenty years later to Bier) for stimulating osteogenesis.

In old ununited fractures of the tibia and fibula complete extension is not so easily attained, and it may be necessary to remove bone. If this be done, the operation should be performed under pulley extension, or by turning the ends of the bone out of the wound and engaging the fragments in shoehorn fashion after the method of Lane. If the case be suitable and the surgeons possess the mechanical skill subsequently to keep a good alignment, it is best to avoid the introduction of plates or screws. The bones should be kept in absolutely good apposition, and where it can be easily accomplished they should be wrapped in transplanted fascia, which will act as a binding membrane in the same way as a periosteum.

In another type of case in which the bone is eburnated with feeble callus production, it is well after sawing the ends to crenate the edges with bone nibblers, and to trans-

plant bone from some other part of the body. The sides of the fractured ends should be prepared to receive the transplanted portion, which can be affixed laterally, or driven into each end of the medulla. The transplanted bones and the fractured ends are held in position with transplanted fascia wrapped around them.

Autogenous transplantation of bone is far more effective than transplantation from another patient or from an animal. A bone graft without periosteum is sometimes as effective as one taken with periosteum. This fact is important, for if bone is removed from some other part of the body subperiosteally, the removed bone is very rapidly replaced by new bone. Where convenient, however, the periosteum should be retained.

Non-union is very apt to occur where a wide gap exists between the bones, as in the case of fracture of the tibia of long standing, where the growth of the fibula has progressed.

Malunion of the femur of six or seven weeks' duration can almost always be corrected by powerful manipulation. The same is true of all the long bones. At his clinic every week the author is accustomed, by wrench or hand, to correct malunited fractures of several weeks' standing. The method is especially applicable to a Colles's or a Pott's fracture.

Weak union can be diagnosed almost with certainty even when ordinary manipulation fails to detect it. It is suggested by tenderness on pressure over the site of the old fracture, and confirmed by the additional sign of exuberant callus exudation. A malunited fracture of some months' duration, if accompanied by these two signs, can usually be corrected by forcible manipulation. This is a very important clinical fact to remember from the point of view of immediate or gradual correction.

Exuberant callus is sometimes so abundant as to be mistaken for malignant disease, and the author has met with many instances in which the patient has narrowly escaped amputation. This error is more likely to occur in the femur than in any other of the long bones, especially when the force applied to produce it has been so slight as to suggest that the fracture was spontaneous.

Malunion of a fracture can always be prevented and should raise a strong presumption of inefficient treatment.

The causes of malunion may be found (1) in errors in the initial treatment or setting of the fracture, (2) in errors in the method of maintaining the fracture in position, or (3) in errors of after-treatment.

Malunion of a fractured bone is due to imperfect setting more often than is commonly supposed. Sometimes it is due to want of knowledge, but more often to want of experience and confidence.

Common causes of inefficient reduction are:

(*a*) Insufficient extension of the limb in fractures of long bones—such as the femur or humerus—so that the overriding of the fragments is not completely corrected.

(*b*) In Pott's fracture there is always an associated dislocation of the ankle outward and backward. If the backward dislocation is not fully corrected there is pain over the front of the ankle when the patient walks, and, in addition, inability to dorsiflex the ankle, which causes a serious impairment of function.

In Colles's fracture the backward displacement of the lower fragment is very serious, and is not always corrected by the orthodox traditional "hand-shaking" method of reduction. The lower fragment carries with it the articular surface for the head of the ulna, and if this is out of line the upper and lower articulations between the radius and ulna are thrown "out of true" and the radius will not rotate properly. This leads to impairment of pronation and supination, and consequent very serious interference with function.

These are merely instances of how a want of sufficient determination in reducing the initial deformity may play an important part in causing subsequent loss of function. The author says he refers to them because he sees a large number of cases of serious

impairment of function really due to these causes.

If the fixation of the limb after the fracture has been reduced is inefficient so that material amount of movement can take place between the fragments, then every such movement causes pain, and produces a reflex contraction of the muscles. This reflex spasm may very readily cause overriding of the fragments, and in the case of the shafts of long bones lead to shortening. In fracture of the neck of the femur it modifies the angle between the neck and the shaft and so causes the flexion of the joint, with the result that body weight is not transmitted in the normal line. In consequence of this, crippling changes of an osteoarthritic character subsequently occur in the joint. Faulty alignment of the bones may arise from inefficient fixation, even in a case in which the fracture was originally fully reduced and the bones brought into correct alignment. The result is that the true line of the shaft of the bone is not maintained and the joint at one end of the bone is thrown out of its proper relation to the joint at the other; in consequence, muscles do not act in their correct line, and the usefulness of the limb is impaired. Further, in the lower limb the line of transmission of body weight is altered, and this throws an improper strain on joints and ligaments, resulting in changes in the joints, in flatfoot, and in other disabling deformities. For instance, in fracture of the tibia and fibula a little shortening of the limb does not seriously impair its strength if the alignment is good. A slight bow-leg even is not serious, for slight bow-leg is a harmless type. Many muscular and powerful men are, indeed, slightly bow-legged, but in a valgoid deformity the weight of the body is carried too far to the inner side of the foot, and this throws too much weight on the arch, and the result is a flat and everted foot.

Any valgus deformity at the knee, in the leg, or at the ankle is a weakening deformity, and greatly reduces the usefulness of the limb. It is a good fault, therefore, to err on the side of producing a slight bow-leg, with its varoid accompaniment, if there is to be any error at all. In cases of malunion, when the callus is still tender, it is generally not difficult to readjust the limb by manipulation without having to perform an open operation. In the case of the femur, this can usually be done two or even three months after the original fracture. As a rule, the worse the position of the bones the longer will the callus take to consolidate.

Callus may yield in such a way as to throw the bone out of proper alignment. A good example of this is frequently afforded by cases of Pott's fracture which have been correctly reduced, and six weeks later are in good position and united. A month after this, however, the patient may complain of some pain at the site of the fracture and also of symptoms of flatfoot.

Here the counter-pressure of the ground on the foot forces the astragalus against the external malleolus, and so produces a lever action, straining the callus. To avoid this, every case of Pott's fracture should be set to work with the inner side of the heel raised to keep the foot inverted, and if the patient is a heavy subject an outside brace also should be worn. It is disconcerting and puzzling to see a perfectly good functional result replaced by a bad one; to avoid disappointment of this kind it is advisable, particularly in fracture of the lower limb, to apply some sort of guard to prevent straining of the callus.

Fractures of the humerus near the shoulder-joint (that is, those of the surgical neck and above the insertion of the deltoid) are commonly associated with inability to abduct the limb fully. The reason is that the upper fragment is often tilted outward, and end to end union does not take place. In order to avoid this, the surgeon's object when setting the fracture should be to bring the fragments end to end if possible. He should pull the arm at right angles to the trunk, or even straight upward, until all overriding is completely overcome, and should then endeavor to engage the end of the lower fragment on the broken end of the upper fragment. By

pressing the two together he can at once tell if they are engaged or are sliding past each other. If they are engaged, the arm can be gently brought down to the side and secured to the trunk by bandages. Once the fragments are engaged they are not likely to become disengaged again.

In fractures about the elbow-joint, with the single exception of fracture of the olecranon process, the usual disability is limitation of flexion.

The limb should therefore be extended to push away any fragment likely to obstruct extension afterward. The forearm should be supinated to make sure of clearing a right of way in that direction, and then the elbow should be fully flexed and bandaged, care being taken not to produce tight circular constriction of the limb in any part. In this way we may make sure that there shall be no callus exudate in the bend of the elbow, and at the same time the tendon of the triceps acts as a posterior splint.

When a stiff elbow, after an injury, has to be dealt with, the same maneuvers are gone through so as to force the recently formed callus out of the way until full flexion is secured. Usually this can be done on one occasion, but in some cases it may be necessary to flex the joint in two or three stages.

In fractures of the bones of the forearm the disability most to be feared is obstruction to supination; pronation is naturally good. Therefore, in setting the fracture, or when breaking down callus and resetting the fracture, the surgeon should extend the forearm and supinate fully in order to make sure of a clear right of way for supination, and then set the fracture, taking care that the ulna is perfectly straight, and that there is no lateral pressure anywhere on the shaft of the radius. It must, however, be remembered that the radius is a curved bone which rotates on the ulna like the handle of a bucket; if the arched shape of the radius is destroyed the joints at its ends will be out of their true line, and impairment of function will be the result.

Fractures of the carpus often result in a stiff wrist in a flexed position. Every schoolboy knows that the grasp of the hand is weakest when the wrist is flexed. Therefore, in every case of fracture or injury of the carpus, the wrist should be put up in a hyperextended position.

If the wrist has been allowed to get stiff in a flexed position, it should be dorsiflexed under an anesthetic and fixed in that position. In rare instances a fragment of the scaphoid is displaced on to the dorsum and blocks extension; if this has occurred, it may be necessary to remove the fragment before the wrist can be hyperextended.

From fractures near the ankle-joint many patients complain of both pain and stiffness which lasts for months or years. There are two principal factors responsible for loss of function here. Eversion of the foot, for instance, is fairly well recognized as one of them. If the patient is allowed to recover with the ankle in a valgus position, the body weight when he stands will fall too far to the inner side of the foot, and at once all the factors which make for flatfoot are produced. It is, however, not sufficiently well recognized that these conditions may be at work in an ankle which has every appearance of being in good position when the patient is discharged from hospital. Straining of young callus by body weight is common in fractures around the ankle-joint, owing to the patient being allowed to walk on the unprotected joint too early. Therefore these patients should all be turned out with "crooked" heels and often with an outside brace as well, to insure that the body weight shall fall on the outer side of the foot. The natural corollary of this is that if body weight will produce a valgus deformity by straining the callus, it will also correct it if we "crook" the boot well, and therefore when the callus is already strained in the valgus direction, and the patient comes with a stiff painful ankle and foot, all we need to do in many of the milder cases is to crook the boot well on the inner side, and let the patient "walk out" his deformity. In older and more severe cases it is

from the first necessary or advisable to wrench the foot into an inverted position under an anesthetic, and then let him walk with his feet crooked; this is made easier by the application of an outside brace. If this after-treatment is not persisted in for some weeks the condition will most likely recur.

The second great disability, after injuries about the ankle-joint, is inability to dorsiflex the ankle. The patient, when walking, cannot get forward on to the toes and fore part of the toes without pain across the front of the ankle.

This is a very difficult condition to correct once the deformity has been allowed to become established. The proper thing is to prevent it when the injury is recent; to make sure of this the surgeon should dorsiflex the foot and so satisfy himself that he has commanded a complete and clear right of way for this movement in the future.

Both these disabilities are well illustrated by cases of Pott's fracture; this injury essentially consists of a fracture of the fibula about three or four inches above the external malleolus with a dislocation of the ankle outward and backward. There may be minor complications, such as fracture of the tip of the internal malleolus or the less well-recognized fracture of the edge of the articular surface of the tibia. These, however, do not alter the general nature of the disability.

The method of reduction adopted is the following: The knee is flexed to relax the calf muscles. If these muscles give trouble, tenotomy of the Achilles tendon will put them out of action, but this is only necessary in exceptional cases, and strength returns but slowly after this apparently harmless operation. Grasping the foot by the heel in one hand and the dorsum in the other, the foot is pulled and everted to make sure of thoroughly disentangling the fractured ends. While still pulling, the foot is fully inverted and the ankle dorsiflexed. If the ankle cannot be dorsiflexed fully, it means that there is a definite posterior dislocation or that the anterior edge of the tibia is fractured. It is necessary then to push the tibia back and bring the foot well forward until the ankle can be well dorsified. The foot is then fixed in splints in the fully inverted position and dorsiflexed a little beyond the right angle. If the surgeon maintains it in this position, he may wait with confidence for a good result. If he is content with a less thorough reposition, he is in great danger of getting a result with some stiffness, pain, or limitation of movement, which will seriously interfere with comfort in walking. Since the days of Percival Pott many splints have been devised. The shape and style of the splint does not matter a jot. The important element is the surgeon. If he knows his work, he will fix the foot in the position described and will be rewarded by a good result.

Malunion and consequent functional disability depend on two factors: (*a*) eversion, (*b*) diminished dorsiflexion.

Eversion often calls for operation. In comparatively simple cases all that is needed is to pass a chisel through the internal malleolus, and also through the site of the old fibular fracture. The foot should then be forcibly inverted, and treatment continued to maintain the inversion.

In the more severe type of case an open operation is advisable. A wedge of bone is removed from the lower end and inner side of the tibia. The wedge should only go a distance of four-fifths through the bone. An osteotomy of the fibula is next performed. The wounds are closed, and not dressed for twelve or fourteen days. The stitches are then removed, and, under gas, the limb is fractured by forcible inversion. This two-stage operation eliminates the anxiety which must attend the treatment of a compound fracture, and is an important matter when powerful manipulation is necessary. For many reasons, however, it may be advisable to complete the reduction at the time of operation.

Dorsiflexion of the ankle may be blocked by callus exudate, the result of fracture of the anterior articular edge of the tibia. Complete dorsiflexion of the ankle at the

time of accident would save the patient from this deformity, for the fragment of bone would in this way be pushed to one side; but if this has not been done, and at a later date we find that dorsiflexion is prevented, an incision should be made and the offending prominence chiseled away. The space left by the removal of bone should be packed with fat removed from any convenient part. This prevents the new callus exudate from giving rise to trouble. In all operations where bone is removed and pseudoarthrosis is desired the generous employment of fat is most helpful. In order to reduce the callus exudation the exposed cancellous bone should be lightly hammered.

In fracture of the tibia faulty alignment may be brought about by posterior bowing; the weight of the body may be thrown so far back that it passes at some distance behind the ankle.

Fractures of the neck of the femur, and all fractures about the small trochanter, should be treated in the abducted position to prevent deformity of the coxa vara type. Stiffness of the hip associated with limitation of abduction, often accompanied by "osteoarthritic" changes in the hip-joint, is the sequel of malunion in this region. To prevent this it is necessary to secure abduction and to maintain extension in the abducted position. If the fracture is of some weeks' standing and the area is still tender, the callus is certainly not consolidated; forcible abduction and extension in an abduction frame and rigid fixation in this position will then be followed by adaptation of the callus to the corrected position.

Fractures of the shaft of the femur, especially in the middle third, are frequently followed by gross forms of malunion, which will excellently serve to illustrate malunion in long bones.

The faults commonly are: Shortening or overriding, due to the fact that (*a*) reduction has been incomplete, the surgeon not having pulled until the fractured limb was at least as long as its fellow; (*b*) the method of fixation and extension used has been inefficient and the muscles have caused overriding after the fracture was set; (*c*) the body weight has caused yielding of the callus after the patient has begun to walk.

Angular deformity or erroneous alignment is the result of inefficient methods of fixation, and more particularly of inefficient extension in the line of the limb. Erroneous alignment throws all the muscles of the part out of line, and, what is more important, puts the joints above and below out of their correct relations. A common fault in fractures at the junction of the lower and middle third is a posterior sagging, which is best seen when the patient begins to walk. The body weight is thus thrown on the posterior part of the capsule. The deformity resembles a genurecurvatum.

Rotation deformity is far too common, and can only be the result of careless and inefficient treatment.

In case of malunion of the shaft of the femur in which one or more of these elements are present, the whole region of the fracture is tender, and is also the seat of pain for weeks and months after consolidation ought to be complete. This means that consolidation is far from complete, and that the callus is the seat of active change. Nature, in fact, is struggling with the problem of buttressing up the malunited fragments so that they can meet the forces which are acting in them, hence the exuberant production of callus, which is attended by pain and tenderness.

In such cases it is not difficult to break down the callus by manipulation. Extension with block pulley and suitable tackle will then stretch the muscles and reduce the overriding by 2½ inches on a single occasion. Rotation deformity is, of course, corrected at the same time.

If open operation is employed, the simplest form of osteotomy is an oblique one through the callus between the original fragments of the shaft. Once these are cut through the greatest part of the remaining difficulty is in fully restoring the length of the limb by extension. The big muscles of the thigh can only be fully overpowered

by the use of block pulley and tackle. When this has been accomplished the leg is fixed in a Thomas knee splint, the tuber ischii rests on the padded ring, the extension straps are secured to the bottom of the splint. We are then sure that, whatever happens, the muscles cannot contract and cause further overriding. The only thing the muscles can do is to give up the struggle, and, as a matter of experience, this is what always happens.

The surgeon finds on his next visit that he can get perhaps another half-inch of lengthening by further extension on the straps. Further, in a Thomas knee splint good general alignment of the limb can easily be secured—in fact, is obtained almost automatically. The only points to which the surgeon has really to attend are the position of the foot—to see that there is no outward rotation—and to keep up firm extension.

Locally, splints are applied to control lateral movement. In the first instance this is not difficult. When resetting a malunited fracture it is not so easy, for the callus already formed gets in the way.

In these malunited fractures of the femur of some weeks' standing with considerable overlapping, after refracturing the bone by force the pulleys should always be applied and a great effort made to secure both length and alignment. To render this less difficult, it may be wise to move the fractured ends freely in all directions to disturb and disengage the fibrous and bony exudate. The extension by pulley should be maintained for several minutes to lessen the resiliency of structure and to reduce the chance of telescoping. The limb is then maintained in extension by a Thomas splint, and on two or three subsequent occasions the pulleys are applied. By these simple means overlapping of three or four inches can be overcome, and an open operation is avoided. The "damming" method already described is applied to assist osteogenesis, aided when necessary by percussion.

Whatever operation may subsequently be needed, the necessity of preliminary pulley traction cannot be too strongly urged, in order to secure a better length, and in this way prevent the sacrifice of bone.

In cases in which union in the vicious position is so complete and firm as to render operative procedures necessary, the procedure to be followed is influenced by the special type of union present. If it is a mere case of faulty alignment, with fair apposition, a small puncture and an osteotomy saw will do what is desired. An *x*-ray photograph should be taken, and the section made through the angle. The case is then treated as one of simple fracture. If there is overlapping of the fragments, with no excessive callus, the saw is introduced between the fragments and the lateral fixation undone. Pulley extension will then diminish or obliterate the shortening, and the subsequent treatment will maintain both length and alignment. In other fractures higher up, with great thickening and lateral deflection, a wedge is removed from the convex side of the bent bone, and a fracture at the point preferred may be produced some days later. Extension and abduction of the limb should then be secured. In rarer instances, when unusual deformity and overlapping have occurred, it may be necessary to explore the fracture by a free exposure, to separate the fragments, to remove bone, and to plate.

THE TREATMENT OF GUNSHOT WOUNDS BY PACKING WITH SALT SACS.

HULL (*Lancet*, May 27, 1916) says that the treatment of septic wounds by a pack which is allowed to remain in the wound for several days is so opposed to the usual teachings of surgery that at first sight its utility may be doubted. Nevertheless, such treatment has proved one of the most effective methods of dealing with septic wounds during the present war. It has also been found to be one of the most generally applicable procedures for the treatment of secondary hemorrhage. It possesses the great advantage of simplicity, an important factor when large numbers of cases require

the attention of a limited staff. It also allows transport to be undertaken without any anxiety regarding the dressing of the wound.

When it is necessary to drain a wound cavity, three methods could be considered.

The ideal method would be to expose the whole of the interior of the wound. There are anatomical and surgical objections to this as a rule, but it is occasionally employed: for example, when a rectal fistula is slit up, when an amputation is performed by the guillotine method, and in certain cases of excision of wounds. Very inferior to this ideal method is the drainage of every pocket and cavity of a wound. The interior of the wound is often very irregular, and it is sometimes impossible to insure that every pocket is drained. The third method, treatment by salt, imitates the first or open method, by draining every portion of the wound surface.

The treatment of septic wounds must fulfil certain requirements. The infecting microbes must be removed by some form of lavage. The outflow of lymph must be increased. The bacterial growth must be repressed and the coagulation of the discharge must be prevented. The tissues of the wound must not be damaged either by chemical or mechanical measures. These requirements may be met by the use of hypertonic solution of common salt.

It can be demonstrated experimentally that the higher the concentration of salt the greater will be its power of attracting water and albuminous substances. The "drawing" power of salt has been known for many years. Sir A. E. Wright's original lymphagogic solution consisted of 5 per cent common salt with 0.5 per cent sodium citrate, used for lavage and repression of the bacterial organisms of septic wounds. Lawson placed tablets of compressed salt in the lumina of drainage-tubes. Col. Gray used solid salt in the form of tablets, which wrapped in gauze formed a strong salt solution.

Packing wounds with gauze impregnated with concentrated salt solution must not be confused with the plugging of wounds with ordinary dressings. Wound cavities are only potential spaces, and in order to drain them the walls must be kept apart. Ordinary drainage-tubes rarely drain every recess, and elaborate methods are required to obtain drainage from every portion of the walls and avoid the shutting off of pockets. A wound cavity filled with gauze and salt may be considered as effectively drained as if the cavity were inverted and the walls dressed as a surface wound. Every portion of the surface area is drained by the osmotic action of the salt, and the capillary action of the gauze and bandage is continually removing the discharge and producing an automatic drainage and lavage of every portion of the interior of the wound.

The tablets of salt must not come in contact with the tissue or sloughing will often ensue. The wall of the cavity must be well protected by gauze. The solid salt sac is an improvement upon the tablets. It consists of a two-walled sac of suitable size made of bandage, between the layers of which four layers of gauze are placed. The interior of the sac is filled with salt and the tail of the bandage forms a drain.

The sac is made by laying a strip of open woven bandage about a foot in length flat on the table. On this strip four layers of gauze are placed the same width as the bandage, but about 4 inches in length. On top of the gauze another strip of bandage is placed. The sides of the bandage strips are then brought together by doubling the bandage in its long diameter and sewing to form a sac. The sac is filled with salt; a few stitches are put in to close the mouth. These sacs are made in several sizes, sterilized in an autoclave, and stored ready for use. One or more of them are used to pack the wound, the intervals between the sacs being filled with gauze. A tube of perforated zinc or rubber may be passed into the depth of a large septic cavity. Long slender sacs are made to fill bullet tracks. Small sacs are made for draining tracks in the brain. The free end of the sac is passed into a vessel containing saline solution, and the wound then drains by capil-

lary attraction. A fine rubber tube may be run in along each sac, and drip irrigation may be carried out if required. The salt remains undissolved for several days, and when the sacs are removed from a wound at the end of a week undissolved salt still remains.

There are two ways of dressing a wound so that no harm is done by the changing of dressing: one is to keep a light dressing continually moist so that its removal is not felt by the patient and no tissue is damaged; the other is to leave the dressing until it is quite moist and can be removed without pain. The dressing of deep wounds is too often merely a ritual; the dressings and drainage-tubes are removed and replaced by clean ones, but the complicated series of recesses which make up the interior of most wounds cannot be reached. They may be reached by irrigation, but some portion of the wound will escape the distending effect of a drainage-tube, and the walls will fall together and a pocket will result.

The effect of the salt sac is to form a concentrated solution of salt which promotes the resolution of inflammatory induration and aids the separation of dead tissue by solution of coagulated lymph. A powerful outgoing stream of healthy lymph is produced which carries microbes and débris out of the wound and retards the bacterial growth within it. It is unnecessary and undesirable to continue the action of this hypertonic solution of salt once the wound becomes clean. If the wound is clean the sacs are removed, usually in from five to ten days, and treatment by normal saline instituted. If the wound is foul it is either again packed with salt sacs or dressed every forty-eight hours with gauze soaked with 20-per-cent salt solution. When the patient's temperature remains high and his general condition is unsatisfactory, it is fair to assume that a streptococcus is present. The presence of healthy lymph induced by the salt sacs does not aid in dealing with the streptococcus, but it appears probable that the most effective defense the body possesses against this organism is the white blood-corpuscles. When normal saline is used the wound, hitherto bright-red, becomes covered with a gray film. This is caused by the protective layer of leucocytes which act as a barrier against further invasion until the healing is completed by the ingrowth of epithelium. The hypertonic solution is therefore changed to normal saline when streptococcal infection appears probable.

The advantages of a dressing which does not require attention for seven or eight days will be obvious. The patient is saved the pain and inconvenience of frequent dressing, there is a diminished risk of secondary infection, and there is an enormous saving in material. The salt sacs have been found useful in many special instances.

A method of treatment which saves the patient the pain and inconvenience of frequent dressing, which forms an efficient method of preventing hemorrhage, and saves an enormous amount of labor and material, is a good method provided its results are equal in all respects to other methods of treatment. The author believes that the results are not only equal to but better than any other known method, provided the technique is properly carried out. It appears rational to add an antiseptic to the salt in foul cases, and eupad appears to be the most useful. Its addition certainly appears to do no harm, and offensive odors are in a great measure obviated by its use. Sacs filled with eupad and salt in the proportion of one to three are destroyed in the autoclave owing to the corrosive action of the hypochlorous acid upon the fabric. A convenient method of combining the eupad with salt is to pack the wound with ordinary salt sacs sterilized in the autoclave and introduce into the middle of the sacs, without touching the wound, an unsterilized sac filled with eupad.

Six days may be said to be an average time for the sacs to remain in the wound. The temperature usually falls to normal within that period. A rise of temperature is apt to follow the dressing; this rise can usually be avoided by irrigating the wound for some hours before removing the salt sacs.

The successful results of this treatment largely depend, as all treatment of septic wounds must, upon an early campaign against the sepsis and upon the thoroughness with which it is possible to remove septic and necrosed tissue.

THE INFECTIOUSNESS OF THE CEREBROSPINAL FLUID IN SYPHILIS.

FRUEHWALD and ZALOZIECKI (*Berl. klin. Wchnschr.*, 1916, 53, 8) point out that the pathology of syphilis of the central nervous system has been advanced a great deal through studies on the cerebrospinal fluid. After it was discovered that the treponema pallidum is the cause of syphilis, it was looked for by numerous investigators in the cerebrospinal fluid, and found generally by microscopic methods and particularly through animal inoculations. The authors' work on this subject was interrupted by the onset of the war, but they had advanced far enough to secure some definite positive results, which were as follows: (*a*) No positive results were obtained in cases of tabes or general paresis. (*b*) Positive results by inoculation methods were obtained in an early secondary case with manifest central nervous system symptoms, and in two others, late cases of secondary lues, in one of which the spinal fluid was entirely normal, and in the other there was a positive Wassermann reaction. The authors were unable to arrive at any rule by which one might judge the infectiousness of the cerebrospinal fluid in any stage of syphilis.

An analysis of the literature on the subject to date reveals the following facts:

(*A*) Acquired lues. (1) Without nervous manifestations: (*a*) primary lues up to the eighth week, negative; (*b*) primary and secondary lues eighth to tenth week, 2 positive cases; (*c*) late secondary lues, third to twelfth month, 5 positive cases; (*d*) tertiary lues, negative. (2) With nervous symptoms: (*a*) early luetic meningitis, 1 positive case; (*b*) "neurotetrecidiv," 1 positive case; (*c*) luetic apoplexy and hemiplegia, 2 positive cases; (*d*) late luetic meningitis, 1 positive case; (*e*) tabes dorsalis, 2 positive cases; (*f*) paresis, 5 positive cases.

(*B*) Congenital lues: (*a*) early cases, 2 positive; (*b*) late cases, 2 positive.

It will be seen from this analysis that the greatest number of positive results occur in the late secondary stage and that a relatively large number of positive findings are obtained in the later syphilitic involvements of the central nervous system. All told, however, the causative agent is found quite infrequently. Spinal fluids containing the treponema may be entirely normal otherwise, in association with a positive or negative blood Wassermann reaction and in the complete absence of nervous manifestations.—*American Journal of the Medical Sciences,* May, 1916.

LOCAL SPINAL ANESTHESIA.

GADGIL (*Lancet,* June 3, 1916), basing his opinion upon an experience of 500 cases, summarizes the reasons for non-success in the use of spinal anesthesia as follows:

Difficulty in entering the spinal canal. This may be due either to nervousness on the part of operators or on that of their patients, whose confidence they have failed to win and who consequently do not keep steady at the time they feel the prick of the needle.

The position in which the patient is placed at the time of the introduction of the needle. There are two positions in which the needle may be introduced. In the first the patient is required to bend forward while sitting at the end of a table; in the second he lies on one side, always, of course, in fully bent position. It is more difficult to introduce the needle into the spinal canal when the patient lies in this second position; the first is the more convenient.

The position after the anesthetic is introduced. It should be with the patient's back propped up, not too high from the horizontal.

The amount of stovaine injected. It is generally not sufficient.

The fear of collapse. This unnerves the surgeon, because he is aware that the patient is watching his actions with anxiety.

The author's suggestions to counteract these defects are:

Do not be disappointed if you do not get into the spinal canal at the first attempt; difficulty in this matter is more common than is generally acknowledged.

For the novice the position of sitting stooped is best. (*a*) Always see that the lumbar spines are quite prominent before introducing the needle. (*b*) Puncture at the upper margin of any of the lumbar vertebræ from the second to the fourth. (*c*) Keep the point of the needle absolutely in the middle line and the whole needle perpendicular to the skin. (*d*) Do not follow the text-book advice, which is to insert the needle a little away from the middle line a little upwards and inwards, as thus the canal is often missed.

The author always gives a full ampoule of the stovaine and glucose solution, which is equivalent to a grain of stovaine, in all adult cases. He has never had any bad effects which he could attribute to a big dose. This full dose does away with the necessity of shaking gently the patient, of making him sit and lie down a dozen times for diffusion of the drug.

In some cases when operating only on one side of the body it is desirable to introduce the drug when the patient is lying on the side to be operated upon. He makes this statement more explicit. If for instance the left knee is to be cut, with the patient stooping forward, the needle is introduced into the canal; the patient is then placed on his left side and the drug is injected. He lies in that position for a minute or two, and is then turned on his back for operation.

The author has never used this anesthetic for any operation above the level of the umbilicus. It takes about ten minutes for anesthesia to spread from the trochanters to the umbilicus, while for rectal operations the effect is immediate.

It is unnecessary to test the sensation before starting operation; though protopathic sensibility is lost, epicritic sensation remains for a longer time, and the patient says he feels pain when he is only feeling a light touch.

When operating on abdominal cases or on any very nervous individual, a hypodermic injection of morphine gr. ¼, atropine gr. 1/100, and hyoscine gr. 1/100 is given three-quarters of an hour before operation. The patient generally remains asleep during the whole course of the operation.

The back rest should be kept about 30 degrees from the horizontal. This height is quite sufficient. The anesthetic does not diffuse rapidly.

When a patient collapses, as evidenced by pallor, nausea, vomiting, and cold perspiration, Gadgil advises the surgeon to remain calm; inject strychnine; raise both legs up in the air, trying to meet the head, as used to be done in order to stretch the sciatic nerves in the old-fashioned way without an operation; and put with the forearms great pressure over the abdomen for five minutes or more. Generally the operation may then be continued within ten minutes.

Headache is the only after-result.

THE APERIOSTEAL STUMP AND ITS CARE.

LYLE (*Annals of Surgery*, June, 1916) points out that the aperiosteal method of amputation aims to produce a painless supporting stump capable of early functional use. The essential points of the technique consist in removing a small cuff of periosteum from the bone stump and spooning out the marrow cavity for a like distance, plus the after-medicomechanical treatment of the stump.

A small cuff of periosteum, 0.5 cm. in depth, is removed, and the removal is carried out in such a manner that no shreds of periosteum remain. Such shreds retaining their primitive osteogenetic function are capable of producing painful bony spikes, which would interfere with the early functional use of the stump.

An illustration of the result of incorrect technique is given. In this case instead of

sawing through the bone the operator raised a cuff of periosteum, then sawed through the bone and cut away the periosteal cuff. In other words, there was an unnecessary stripping of the periosteum, with the resultant formation of numerous osteophytes. In a picture showing an ideal bone end the bone and periosteum were divided together and the periosteal cuff carefully removed from above downward, the marrow being scraped for a corresponding distance. More than 1 cm. should never be removed on account of the possibility of bone necrosis.

The best formed stump if not quickly put to use as a real support may become atrophied and useless. It is this special feature of the aperiosteal method that should be emphasized. The patient is put to bed with the leg elevated. As soon as the wound is healed begin Hirsch's medico-mechanical treatment. Massage the stump twice daily, and after each treatment rub in a 2-per-cent solution of salicylic acid in olive oil. At night bathe in a warm sodium carbonate solution. Protect the stump with lamb's-wool. Place a box at the foot of the bed and have the patient press the stump against it for from five to ten minutes three times a day; then four times; finally every hour. After each treatment energetically flex and extend the hip and knees. Now begin standing exercises. Rest the stump on a bran-bag or a cane-seated chair, at first placing the weight evenly on both legs; later place all the weight on the stump. At the end of two weeks the patient should be able to wear a peg-leg, later a permanent prosthetic appliance, which directly receives the weight through the end of the stump.

If a surgeon decides to perform an aperiosteal or any other type of amputation he has no moral right to undertake it if he is not willing to carry out an after-treatment which aims to provide a painless end-bearing stump. To allow a maimed man to go through life with an ever-present painful stump is a heavy responsibility. Except we have come in contact with a large number of these sufferers we can scarcely realize what the problem means. One thing the author is sure of: they have a very poor opinion of surgeons and surgery. We must ask ourselves if this estimate is just. Considered in the light of past standards it is not; considered in the light of the higher standard set by Bier it is.

An early functional use of the stump is the best method of preventing atrophy. This is in direct opposition to the accepted teachings of this country. The majority of patients are turned over to the artificial limb-maker, who institutes a course of stump shrinking, which lasts from three to six months, until a permanent atrophy of the stump is obtained. The atrophied stump is then considered ready for a permanent prosthetic appliance. Unfortunately, these appliances are designed to aid and abet the vicious atrophy-producing theory. The whole treatment is an attempt to make a part strong by using every known physiological and mechanical means to make it weaker.

PENETRATING WOUNDS OF THE ABDOMEN.

FRASER and BATES (*Journal of the Royal Army Medical Corps*, June, 1916) are convinced that in the vast majority of cases of penetrating wounds of the abdomen operative measures offer the best chance of success. They qualify their statement by excluding from this category uncomplicated wounds of the liver and certain wounds of the kidney. When the wound affects the hollow viscera of the abdomen, it is only as the rarest exception that a spontaneous recovery occurs.

When these cases arrive in hospital they are almost universally in a state of intense collapse. It is therefore advisable to wait for a period of from one to two hours until the increased shock of the journey has subsided.

To this rule they make one exception—those cases which show evidences of rapid and progressive hemorrhage; in such cases

the risks attendant on immediate operation are taken.

During the interval of waiting it is difficult to decide whether or not active stimulant measures should be adopted. These cases are generally complicated by some degree of hemorrhage, and stimulant measures in all probability tend to increase the bleeding; the preoperative stimulation is limited to getting the patient thoroughly warm and administering one cubic centimeter of pituitary extract.

During the operation every precaution is taken to minimize the degree of shock; the theater is thoroughly heated; the table is provided with a hot-water bed; it is advantageous to operate on these cases while they are in the Trendelenburg position.

Immediately before the operation commences the administration of subcutaneous saline by a Lane bag is begun, and it is continued throughout the operation; three to four pints of fluid are frequently given in this way. Good results have been obtained from the use of spinal anesthesia, but there is difficulty in getting the freshly prepared anesthetic, and it would appear that this is an important detail. In two instances patients collapsed suddenly after the administration of spinal anesthesia. Lately, and on the suggestion of a paper by Yandell Henderson, they have employed closed ether anesthesia. The paper above mentioned deduces evidence to show that by this method of anesthesia shock is considerably lessened. It has given them great satisfaction.

Briefly, the operative technique which they have employed is as follows:

The abdomen is opened in what would appear to be the most suitable situation and generally in the middle line. A large incision is employed. If the abdominal cavity contains a large quantity of blood, sufficient of this is rapidly swabbed away with a long roll of dry gauze to clear the view. A systematic examination of the various viscera is now carried out. They begin by picking up the cecum and recognizing the ileocecal junction; they work back rapidly along the whole length of small intestine, examining not only the gut but also its mesentery. The large intestine is reviewed, special attention being paid to the various flexures. If necessity arises the stomach on both aspects, the duodenum, the liver, and spleen are examined. It is a wise precaution to palpate both kidneys, especially the left kidney, in cases of damage to the spleen. The pancreas is reviewed during the examination of the posterior wall of the stomach. The pelvic viscera are examined last, and to facilitate their examination the residual hemorrhage is more completely cleared away. The question arises whether or not the abdominal cavity should be washed out. In early cases with extensive soiling of the peritoneal cavity they have done so; in later cases, and in those which showed evidences of peritonitis, they have not done so. They have found it sufficient to establish drainage by a single Keith tube, passing into the pouch of Douglas. In special instances they have closed the abdominal wall with through-and-through sutures of silkworm-gut, guarded where they pass over the wound junction with small pieces of capillary rubber tubing. A Doyen handled needle is the ideal instrument for inserting these sutures.

Throughout the operation speed is an important factor, coupled with every possible avoidance of shock. As regards the postoperative treatment, it is similar to that of every other abdominal operation. Special attention is paid to the administration of fluids; for choice by the rectal route, and by subcutaneous infusions.

The prognosis, of course, very largely depends on the degree of the injury sustained, but an even more important factor is the length of time which has elapsed since the injury was sustained. Early operation offers the best and surest chance of ultimate success. In reviewing the statistics of the results of such operations as these it is impossible to consider the question *en masse*. Each individual case must be considered, for the chances of success depend upon so many factors that it varies enormously in different instances.

REVIEWS.

STUDIES IN IMMUNIZATION AGAINST TUBERCULOSIS. By Karl Von Ruck, M.D., and Silvio Von Ruck, M.D. Paul B. Hoeber, New York, 1916. Price $4.00.

American practitioners have known for many years that the authors of this book have been actively engaged in the study of tuberculosis, and in the endeavor to produce substances which would better enable the body to combat this almost universal infection. Some of their results have not been generally accepted, but every one has, we think, become convinced of their earnestness and admired their persistence in following year after year the difficult task which they have set before themselves.

The opening chapters of the book deal with theoretical considerations as to the tuberculosis problem and natural and acquired immunity. Part Two deals with practical immunization against tuberculosis and describes the methods which the authors follow with the types of cases which they think most suitable. Part Three deals with experimental studies in immunization against tuberculosis in the lower animals, notably guinea-pigs and rabbits.

The book is an exhaustive one containing more than four hundred pages of rather fine type. It will not, in all probability, appeal very strongly to the general practitioner, but it will attract attention from those who are devoting themselves to the study of tuberculosis, whether it be in the laboratory or at the bedside.

VENESECTION. A Brief Summary of the Practical Value of Venesection in Disease. By Walton F. Dutton, M.D. Illustrated in Black and White and Colors. F. A. Davis Co., Philadelphia, 1916. Price $2.50.

That venesection passed too much out of fashion in the latter part of the last century is undeniable. It is now returning to its own place, but probably is not practiced to the extent that it should be. The author's design in preparing this book has been to familiarize practitioners with the class of cases in which venesection often does good. He believes it is useful in a very large number of conditions from alcoholism and amenorrhea to uremia and sunstroke.

A defect of the book is the tendency of the author to wander too far from the actual practical application of his subject, and possibly some of his readers will consider that he is too enthusiastic in recommending bloodletting under certain conditions in which many would be afraid to try it, as, for example, in typhoid fever, yellow fever, and other diseases which are distinctly asthenic in character. From time to time the author quotes cases in his own experience which seem to support the views which he enunciates, and he frankly and freely quotes from the writings of other medical men who are more or less well known.

As an interesting summarization of an important subject it can be recommended.

MILK AND ITS HYGIENIC RELATIONS. By Janet E. Lane-Claypon, M.D., D.Sc. Illustrated with Plates and Diagrams. Longmans, Green & Company, London and New York, 1916.

This book, which is published under the direction of the Medical Research Committee, National Health Insurance, of England, has its contents well described in its brief title. It contains nineteen chapters dealing with the composition of milk, its so-called biological properties, breast feeding, and the nutritive value of boiled and dry milk, the importance of milk in the induction and carrying of disease, and the presence of pathogenic bacteria in butter and cheese. Other chapters deal with the development of the mammary function, on the development of human milk, and on methods used for the destruction of bacteria in milk without the application of heat. There are eight plates, three of which are devoted to bacteriological topics and the others to the methods used in the preservation of milk and for preventing contamination. The use of electricity in the treatment of milk is also described. The chapters have attached to them very copious bibliographies.

This book is one which will prove of

the greatest interest to dairymen, hygienists, and physicians, and is possibly the best and most scientific presentation of these important subjects that has ever appeared.

THE EXPECTANT MOTHER. By Samuel Wyllis Bandler, M.D. Illustrated. W. B. Saunders Company, Philadelphia, 1916. Price $1.25.

Dr. Bandler, who is already well known because of his practical work upon Medical Gynecology, has written a little book of about two hundred pages, which is designed to place in the hands of the expectant mother in simple language a description of the processes which relate to pregnancy, labor, and the postpartum period. Attention has also been given to the subject of puberty and the adolescent girl, many of these pages being taken from the author's more technical volume.

We have often spoken of the difficulties which beset a medical man who attempts to prepare text for the laity. It is almost impossible to clearly express certain facts in non-technical language, and it is difficult to determine how deeply the author should go along certain lines.

After a brief anatomical consideration the author discusses the subject of fecundation, describes the spermatozoa and ova, and later discusses the nourishment of the ovum, the nausea-toxemia of pregnancy, the care of the breasts, superstitions about pregnancy, involvement of the kidneys, and, after this, he introduces a description of labor and postpartum states.

Whether it is wise to describe to a pregnant woman the condition called eclampsia is for our readers to determine.

The author has been wise in introducing a brief chapter upon so-called "twilight sleep," and we think that he has done well in condemning it for the average case. A passage in this chapter illustrates the difficulty of giving advice to the laity. Speaking of uterine inertia the writer dogmatically asserts that pituitary extract should be used in practically all such labors. This may be his opinion, and doubtless it is correct in a very large proportion of cases, but it may place an individual practitioner in an awkward predicament if he decides that pituitary extract should not be used in a given case and the family have this author's assertion that it should be employed.

Taking the text all in all, it is reliable, clear, and accurate, and those physicians who desire to place such a book in the hands of their patients cannot find a better one.

CORRESPONDENCE.

LONDON LETTER.

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Throughout the whole of this month we have experienced unseasonable weather, though it is more pleasant than great heat.

Owing to the recent offensive in France the hospitals are much more full than usual, but mostly with surgical cases. In judging of the severity of the wounds, one is of course guided by those which come under immediate notice. The cases which I have seen have been rather more severe than usual, consisting largely of septic fractures, and in several cases secondary hemorrhage has occurred. Under these circumstances, medical cases are rather crowded out, but at the end of last month quite a number of men with nephritis were admitted. These were milder than those seen previously, especially where the men had reported sick soon after symptoms arose. About a half who were seen a week after reporting sick were only passing a small quantity of albumin, which disappeared in the course of two or three days. There are still a number of men left in hospital with nerve injury, chiefly resulting from scar tissue in the neighborhood of the nerve. Improvement is very rapid in those cases in which the nerve can be freed from this tissue by operation.

The effect of the war is now becoming

obvious. Fewer young men are to be seen on the streets, and a correspondingly larger proportion of women—the difference can be observed between this month and two months ago—but in spite of the large numbers who have gone, quite a sprinkling of young men are met. Judging from appearances, these are largely of the Jewish persuasion. The proportion of bus and tram conductors who are women is on the increase, postal work is being undertaken by greater numbers, and this morning in an insurance office I found ten women and no men. The streets also show the presence of fewer vehicles, both motor and horse. This is likely to be more pronounced than even at the present time, as a large number of motor buses are being withdrawn. Every day the newspaper has notices cancelling the buses on certain routes. The lines which are being withdrawn are those which run into the country districts, but few which run along the main thoroughfares have been withdrawn. It is, however, to be expected that even those on the main routes will shortly be diminished in numbers. The reason given is shortage of petrol.

The government has now taken seriously in hand the treatment of venereal disease. It is anticipated that an increase is taking place, and will be more marked later on, accordingly preparations are being made to deal with this in the near future. The Local Government Board are acting energetically. The principle on which action is being taken is that anybody affected should have the right of treatment gratis. With this object centers are to be established where such treatment can take place, and indeed I am informed that all preparations have been made and the staff appointed in some of the larger areas in the north. At the present time syphilis seems to be chiefly aimed at, and the centers formed will largely have to deal with the performance of tests based on the Wassermann reaction. Any patient or doctor in the district affiliated to the center will have the right to send blood to the laboratory. Salvarsan or one of its substitutes is to be supplied gratis, and the injections may be given either by the doctor in charge of his patients or by a medical man attached to the center, who may be the pathologist. The centers will naturally be established in connection with preëxisting pathological laboratories. The Local Government Board are therefore asking the hospitals which at present have laboratories and skilled pathologists to come into the scheme, and to set aside a few beds for the treatment of the condition. They are prepared to pay for the accommodation supplied, and are further asking that facilities may be granted to any practitioner to learn the methods of treatment. This is therefore to be considered only a preliminary measure, which can be expanded later on when the new army is disbanded. At the present time practically all men suffering from this condition are treated in the military hospitals, either those permanently established as military hospitals, or those which are wholly or partly taken over by the military authorities. The Local Government Board are anxious that publicity should be avoided, hence there is to be no notification, and special clinics devoted to the condition are not to be held. It is, however, suggested that medical and surgical clinics should, to a certain extent, be held in the evenings, after working hours, in order that attendance may be facilitated.

This scheme coming on top of the National Insurance Act and the treatment of tuberculosis is a strong indication that the government intends in the future to have a much greater control over the health of the nation, and is a distinct advance in the right direction. This present step has been taken largely as the result of inquiries into the cause of prenatal mortality. Inquiries into this subject have, however, given an unexpected result, in that fewer prenatal deaths can be attributed to this condition than was formerly considered to be the case. The percentage is, however, still high, and should this cause be eradicated a considerable fall in the mortality should result.

Largely as a result of the war, people's thoughts have been turned to the consideration of the declining birth-rate, though the

matter had been under consideration prior to 1914, and the research instituted at the request of the Local Government Board in the cause of antenatal deaths had been initiated, if my memory serves me rightly, in 1913. In any case the subject has been brought into greater prominence through the war. A short time back a report was issued by the committee sitting to investigate this question. A perusal of the report does not bring to light any new or unexpected points, but emphasizes the fact, well appreciated before, that families are deliberately limited. Various reasons are given for this limitation. There is no doubt that the standard of life in every class has been improved, and it is pointed out that the average number of children diminishes according to the rise in the social scale. From this it has been deduced that selfishness enters largely into the consideration of the parents, and it cannot be denied that as a nation we are more pleasure-loving than formerly. But it can equally well be asserted that a general desire for the welfare and comfort of the children has been taken into consideration by the parents, who shrink from the thought of allowing their children to endure the privations and struggles through which they themselves have passed. Such parents at the present time having only one or two children, perhaps all of them serving at the front, are filled with anxiety and possibly with remorse. At the same time there are contributory factors, of which one of the most important is the tendency of the country folk to migrate to the towns. In urban districts the birth-rate is lower, and the death-rate in relation to the children is higher, and it has been recommended that an agricultural policy should be adopted in order to get the people back to the land. Again it is an obvious fact that women employed in factories are unfitted to bring up families, and the family itself is a drag on the mother who wishes to continue the life she was living before marriage. There is no doubt that in the immediate future more women will be employed in factories, though a large number of these will be spinsters. An inadequate wage is also urged as the cause of small families, but the question is promptly asked, "What is a living wage?" This question is itself directly bound up in the question of house rent, and whereas in the country districts the man's wage may be 15 shillings a week, with a house rent of half a crown and a plot of ground a quarter of an acre in size, for which he pays 5 shillings a year, and on which a considerable amount of vegetables can be grown, we find living in the central districts of London people who have to pay 12 shillings or more for a single room, in which whole families dwell, the weekly wage being only 25 shillings and everything to buy. This seems to be the root of the whole trouble, and for a number of years a fight has been going on against it in two ways: by the demolition of the slums, and by the provision of better houses which can be reached by the tram or by one of the suburban railways.